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Where Pump Dredges Are Preferred

Mississippi and Eastern Louisiana Sand and Gravel Operators Pump and Repump

By Walter B. Lenhart
Associate Editor, Rock Products

Right — Jahncke operation at Roseland, La.

Below—Plant of Holloway Gravel Co., Amite, La.

Top—Dredge of Hattiesburg Gravel and Supply Co., Hattiesburg, Miss. Below—Dear and Johnson operation, Amite, La.

WHILE THERE are no sand and gravel operations in Jackson proper, that capital city of Mississippi is headquarters of five producing companies, the Brookhaven Gravel Co. being probably the largest; in fact one of the largest in the state. The other companies are the Pearl River Gravel Co.; the Gatesville Gravel Co.; the T. E. Stevenson Sand and Gravel Co. with a plant at Rosella, Miss., some 28 miles east of Brookhaven, and the Jackson Gravel Co. with a plant at Myles, Miss. The State Gravel Co. is in the formative stages with offices in Jackson.

The Brookhaven Gravel Co. has its main operation about six miles from Brookhaven with a smaller one at Crystal Springs, having taken over the former Copiah Gravel Co. at that place. At Crystal Springs are a small suction dredge and a washing plant, which were not operating. The material is bank-run clay-gravel.

Pumping from a Track Hopper

At the main operation at Brookhaven two steam shovels and a dragline were in operation, the latter on stripping. These are for loading bank run clay-gravel also. How-

At the plant of Brookhaven Gravel Co. part of the water from washer is returned to the track hopper and used to sluice out gondolas

ever, if desired, the standard gage railway gondolas loaded with clay-gravel can be switched to the plant where they are dumped to a track hopper. The track hopper is in reality a submerged pit which is emptied by means of a 12-in. Amsco manganese-steel pump direct-connected to a 300-hp. Westinghouse induction motor. The pump delivers to the washing plant. The washing plant was built about eight years ago and uses the Gilbert screens of the Stephens-Adamson Manufacturing Co. Some of the excess water from the screens is returned to the dumping hopper and is used to sluice out the gondolas as they are being dumped to the track hopper.

The company also has a comparatively new 12-in. suction dredge using exactly the same equipment as that at the track hopper but at present owing to the distance the material would have to be pumped, the dredge is not used.

As the demand for washed gravel is at present slack, the company is building a smaller plant, which will have stationary screens and will be served by the suction dredge, thus when small tonnage shipments are in sight the smaller plant will be used and for larger shipments the larger plant will be used. Thus costs will be kept at a minimum. This is probably one of few instances where a new plant is being built to cut down production rather than to increase production.

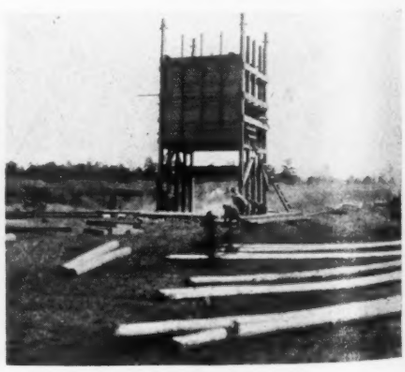
Brookhaven District a Prolific Producer

The deposit at Brookhaven has produced in the past 20 years an enormous amount of material. The pit as excavated has an average bank height of 25 ft. and in some places as high as 60 ft. The length of this bank, while circuitous, is over two miles, giving an idea of the amount of gravel that has been taken out.

Practically all of the roads in Mississippi are gravel surfaced, though roughly one-third of the area of the state is delta land, which is devoid of anything resembling gravel or rock; it is just plain loam when dry and sticky mud when wet. There are other great areas that have practically no gravel, and where they do have gravel it is off the railroads, so when an operator does have a deposit of any size the movement of material is surprisingly large.

Though large shipments, 200 cars or more a day from some of the pits have been common, this condition is not likely to come again, for the big production of bank-run

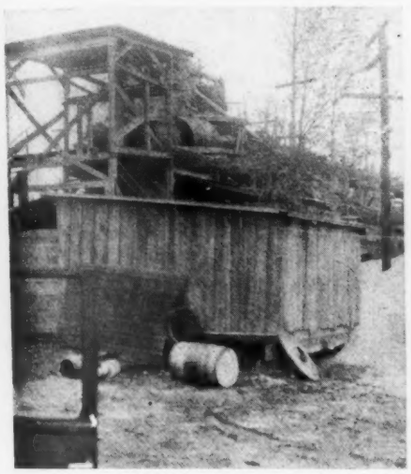
Pit of Brookhaven Gravel Co. has over two miles of gravel bank



New washer for Brookhaven

material is apparently on the decline. The tonnage of washed gravel is about holding its own.

The gravel in the bank is partly consolidated and must be shot lightly for the shovels. No. 3 "Hercamite" is commonly used for this purpose. The bank varies in gravel content, having roughly 70% gravel near the surface, and as depth increases the percentage of gravel decreases, and that of the sand and clay increases. The bank will average about 50% gravel, all of which is



Hattiesburg Gravel and Supply Co. uses rotary screens

of rather small size, very smooth and practically all silica.

The headquarters of the Mississippi Valley Sand and Gravel Producers Association is at the office of the Brookhaven Gravel Co., in the New Merchants Bank building, at Jackson, Miss. T. W. Maddux, general manager of the Brookhaven Gravel Co., is president of the association and R. Lee Stamps of the same company is secretary.

Hattiesburg Another Big Producing Center

The gravel deposits in the vicinity of Hattiesburg, Miss., also have been large producers in the past, but owing to a recent change in freight rates into the territory south of them shipments of late have been below normal. However, four companies operate in the district, three of which are all within a mile of each other. The other operation is that of the Concrete Gravel Co., which during the past year moved its dredge and plant to Lux, Miss., some 10 miles from Hattiesburg.

The deposits at Hattiesburg are all high in sand content, ranging around 20 to 30% gravel, all of which is of relatively small size. Probably 85% of the gravel would pass a 1½-in. screen. This condition calls for very simple screening plants, which usually consist of stationary screens of sufficient height to discharge direct to cars, and the sand either flows direct to the waste ponds or to home-made settling boxes.

The ease with which one can get into the sand and gravel business here, due to the small amount of equipment necessary and the simplicity of the operations, has been the main reason for the over-planting in the states of Mississippi and Louisiana. A simply constructed barge, a 10- to 12-in. pump and a motor with a few stationary screens, and one is in the gravel business! The amount of pipe line used depends on the age and productivity of the producer, but most of the operators, the Brookhaven and the Columbia gravel companies possibly excepted, use 300 to 400 ft. of pipe for delivery of the material to the screens. In Louisiana considerably greater pumping distances are common.

The American Sand and Gravel Co. and the Hattiesburg Gravel and Supply Co. have joint offices in the Citizens Bank building, Hattiesburg, but the two plants are operated separately and each company maintains its identity.

The Hattiesburg Gravel and Supply Co. uses a 10-in. Bennett pump powered with a 300-hp. General Electric motor, and the American Sand and Gravel Co. a 10-in. Amsco pump with a 250-hp. motor.

Most of the companies operating in the Hattiesburg, Miss., district use purchased electric power, but one operator, the Forest County Gravel Co., generates its own power using a Diesel-engine-driven 320-kw. General Electric alternating-current generator. Six-cylinder St. Mary's Diesel engines are used. This is a rather novel installation as it consists of four 60-hp. engines and two 70-hp. engines, all of the horizontal type and all connected to the same crank shaft. The engines at full load are said to burn 27 gal. of fuel oil per hour.

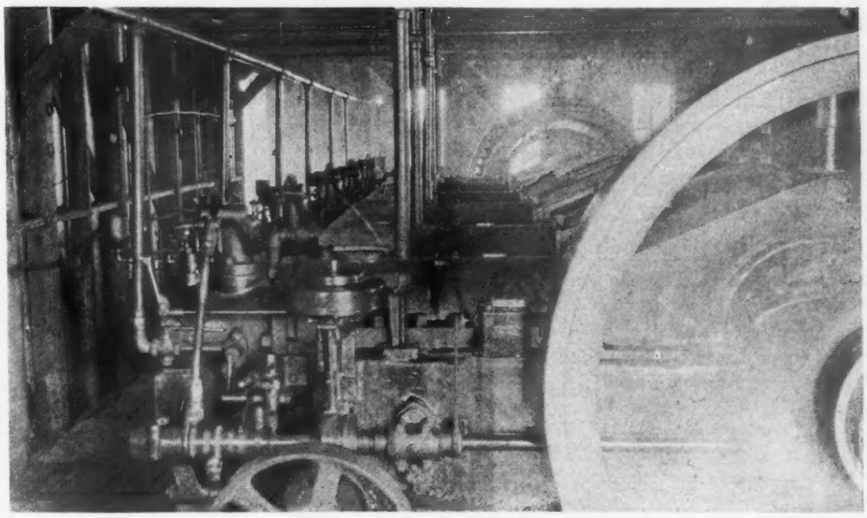
The Forest County Gravel Co. was formerly the Louisiana Sand and Gravel Co., of Hattiesburg, with personnel the same as the older company. N. W. Rockett is president, I. V. Austin, secretary and treasurer, H. E. Majors, vice-president and Rich Wellington superintendent.

This company uses a 10-in. Amsco pump driven by a 250-hp. General Electric motor, which pumps to stationary screens. Recently the company moved the dredge across the highway from its previous location, which required pulling the entire dredge bodily out of the old pit with chain blocks and lowering it into the new pit. The company does some stripping using a dragline. The two other producers at Hattiesburg do not strip.

The Richton Investment Co., at Richton, Miss., some 30 miles east of Hattiesburg, has a very unusual deposit. It, too, has shipped, in the past, large tonnages of material, most of which was bank-run. Later a washing plant was added, although both types of material can still be shipped. When bank-run is wanted one portion of the pit is used, the material being loaded direct by steam shovels, but when washed material is wanted a Diesel-engine-driven pump dredge is used. The pit for the operation of the dredge is not naturally provided with water to float the equipment but water is pumped

Dredge of Richton Investment Co., Richton, Miss.

into the depression for that purpose. The dredge at present is working near a bank that ranges from 30 to 65 ft. above water level, of which all but about 4 ft. of the top is practically all gravel. This gravel, like the Brookhaven material, is a hard, flint-like, well-worn gravel of relatively



Diesel engine in shore plant of Forest County Gravel Co., Hattiesburg, Miss.

small size. The difference between this deposit and that of the other Mississippi deposits is that the bank, other than the trippings, is practically all gravel, at least 90%. Practically no clay is present. This material, too, has started to consolidate and stands practically vertical to the water's edge.

Activities in Louisiana

The state of Louisiana, as far as the production and sale of aggregate is concerned, can be divided into two sections, the eastern district, or that territory east of the Mississippi river, including New Orleans, and the district west of the Mississippi river. The annual tonnage east of the river will average about 3,000,000, and that west of the river about 2,000,000. The prices east of the river are uniformly lower, mainly on account of more severe competitive conditions; the greater number of plants whose main outlet is the New Orleans market. The west-of-the-river producers, however, owing to excessive stripping costs and other unusual operating conditions, have a much higher operating cost. The highway work being done by the state is fairly well scattered over the whole state.

East of the river there are listed some 11 operators and west of the river about the same number so the territory is amply supplied with plants; far too many probably for the peace of mind of the producers.

In the past, especially in New Orleans, newspapers were said to have carried inspired articles to the effect that prices for sand and gravel were some 16% higher than any other place in the United States. When one considers the number of plants; their large capacity and the comparatively small total tonnage consumed yearly in the district, this is obviously an absurd statement. In reality prices have been as low as 7 cents per ton for sand and 30 cents for gravel. When a fair price is asked the public through such misleading propaganda is led to believe that it is paying an unwarranted high price. There is also a considerable tonnage of oyster shells used in the district, that for some uses is a competitor of gravel. The tonnage figures quoted do not include any of this material.

A Conspicuously Over-Planted District

The producers in eastern Louisiana are quite busy owing to an extensive program the state highway department is now putting under way. Some $85,000,000 is being spent, lettings being at the rate of $10,000,000 per month during the spring and summer. This business is coming at an opportune time for most of these producers, because business up to this spring has been very slack, but the amount of aggregate that even this highway program will require will be small compared to what the plants could produce, if called upon to operate to anything like full capacity. Nevertheless two new plants are in process of construction and several more are in various promotional stages.

Some aggregate is being used on the Mississippi levee work, but not in any appreciable tonnage—far less than most northern operators have been led to believe through the various news and news reel agencies.

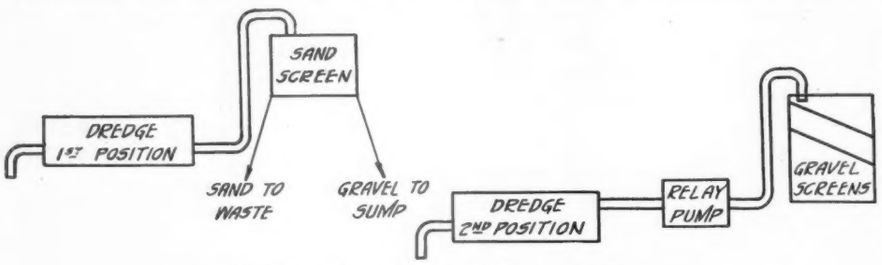
The productive area of eastern Louisiana is some 100 miles southerly from Hattiesburg, Miss., this area taking in the producing districts of Bogalusa, Sun, Roseland, Amite and Franklinton. Operators here ship into the New Orleans and Baton Rouge markets mainly.

Recently, all but one of these producers underwent reorganizations so that there are now in reality only two active companies in the district. They are the newly formed Flint Sand and Gravel Co. and the Holloway Gravel Co., the former being the parent company of a new consolidation. There were eight companies in this consolidation with a total of 11 plants. Several new companies, however, are in various promotive and construction stages there.

The deposits in eastern Louisiana are all high in sand, most of which is wasted in the dredged-out portions of the pits. Universally the practice as regards sand recovery is simple, using wooden troughs, operated in series, the first one producing the concrete sand and the second one the mason's sand.

None of the operations except that at Bogalusa uses rotary or vibrating screens. The Jahncke operations at Roseland did include a rotary screening plant but the plant is now so far distant from the dredging points that it is not in use. Most of the operators rinse at the loading operation.

As the gravel is all of relatively small size—roughly all minus 1½-in. with 85% minus 1-in.—screening is a simple operation, similar to those already referred to in Mississippi.



Method of using relay pumps for long distances

Clay and clay balls are a problem with all the operators in the district surrounding Amite and Roseland, but none of the operators there uses any special method of breaking down the balls, relying on hand sorting while the car is being loaded. It is not unusual to see five to seven men in a gondola picking out the clay balls and throwing them to a pile alongside the screening plant. At the same time these men throw out a considerable amount of roots, brush and other trash. The amount of the clay in the gravel varies considerably throughout the individual deposits.

In the Amite and Roseland districts the deposits are roughly 25 ft. in thickness with 15 to 20 ft. below the water level. No stripping is done except to remove brush and small timbers, which in several instances is quite a heavy expense.

"Relay" Dredge Pumps

Operations have been going on in this district for about 16 years and some of the pits have been productive enough that several acres are worked out each year, thus causing the dredges to work at greater and greater distances from the screening plant each season. To offset this the operators either must build new washing plants or use a "relay" pump dredge. Some of the operators having more than one dredge use one to excavate, which pumps the material roughly half the distance or more towards the washer, where it is discharged back to the pond, and a second dredge picks up the material a second time and sends it to the washer. Thus the material passes through at least two pumps before it reaches the plant. While the method of pumping twice in this manner has its drawbacks it does help disintegrate the clay balls that are present to a more or less extent in all of the operations in the eastern part of the state.

If the operator is far distant from his washing plant and has only one dredge it is common practice to use the dredge to dig and deliver towards the washing plant, depositing the material back into the pond, then to move the dredge to this deposited material and re-pump it to the washer. One operator digs his material, moves the dredge and relays the gravel to a third shore pump that serves his screening and washing plant.

All of the operators in the Amite-Roseland-Franklinton district of Louisiana use electric power with one exception, that being a Diesel-engine-driven unit. In the latter district the new plant of the Consumers Sand and Gravel Co. will be electric-driven, as power lines have just recently been extended into the district. The motors for driving range from 150-hp. to 400-hp. depending on the distance pumped with probably 90% of the motors being 300 to 400-hp. The dredges are all either 10-in. or 12-in. pumps, with the 12-in. size leading in numbers by a wide margin. It was said that the upkeep for shells, liners, impellers,

Jahncke operation at Roseland, La.

etc., would run about $3500 per dredge per year for a 12-in. pump.

Another new plant that will soon be constructed at Bainey, Miss., expects to use a Diesel engine for driving the pump. In that district the small towns all have their own municipal electric power plants, many of which were Diesel driven, but since the Alabama Power Co., and other large public service corporations, have extended lines into these towns the smaller plants have shut down and disposed of their equipment. This sand and gravel company expects to use one of these old Diesel units.

At Roseland and Amite

At Roseland and Amite, two small towns, not over five miles apart, are four gravel companies, three of which are now a part of the newly formed Flint Sand and Gravel Co. These three companies operated formerly as the Jahncke Service, Inc., Dear and Johnson, and the National Sand and Gravel Co. The fourth company, still operating independently, is the Holloway Gravel Co. There are eight dredges in these two localities and several so-called relay plants.

The plant at Roseland, formerly operated by the Jahncke Service, Inc., consists of four 12-in. Amsco dredges, only three of which are in operation at present. Two of the dredges dig the material quite a distance from the screening plant and deliver the gravel back to the pond about 300 ft. from the screens. From here the third dredge picks up the material and pumps it to the screening plant. One of the dredges operates about 1200 ft. from the plant and the other one about 600 ft. The more distant dredge uses a 400-hp. motor and the closer one 350-hp. A 250-hp. motor is used on the relay dredge. This arrangement calls for a considerable outlay of pipe, about two carloads of 12-in. pipe per year. The plant produces 35 to 40 cars of gravel per day and 15 cars of sand, normally, although a far greater production of sand is possible. The plant uses stationary screens throughout and rinses at the loading chute with fresh water from a 6-in. centrifugal pump.

This operation, as well as that of the Holloway Gravel Co., the National Sand and Gravel Co., and that of Dear and Johnson are all served by the rails of the Illinois Central R. R. with that railroad doing the switching for the plant, whereas the other three companies have to supply their own switching facilities; usually a standard-gage 55-ton steam locomotive.

The Holloway Gravel Co. at Amite, La., is one of the largest producers in the field and is the only old producer in the district that is not a part of the newly organized Flint Sand and Gravel Co. It uses two 12-in. pump dredges and a 10-in. relay plant.

The Dear and Johnson plant, near Amite, La., also has a 12-in. Amsco pump dredge, which operates at a considerable distance from the washer. The pump on the dredge delivers the material to a shore plant consisting of stationary screens, which take out most of the sand and reject it. The gravel, with some of the sand, is returned to the pond alongside this washer. When a sufficiently great amount of material has accumulated around this small plant the dredge is moved to the pile and the gravel is delivered to a sump alongside the plant where a 10-in. pump belted to a 150-hp. motor picks it up the third time and delivers it to the screens.

This operation differs from the others in that most of the sand is removed during the first pumping operation, thereby reducing the total amount of material to be handled to get a car of gravel during the second pumping. It was said that when the dredge was attacking the accumulation from the first dredge operation, 50 cars per day could be loaded. The total distance the material is being pumped is at present roughly 900 ft.

The plant of H. J. Cowgill, Bogolusa, is now part of the Flint Sand and Gravel Co. It has a pump dredge, similar to others in the district, using a 10-in. Amsco pump belted to a 300-hp. motor. The plant is one of the few in the district using vibrating screens (Hum-mers) in conjunction with stationary screens for preparing the gravel. A very clean and well graded material is produced.

The Louisiana Sand and Gravel Co.'s plant at Sun, La., was taken over by Mr. Cowgill and is now a part of the Flint Sand and Gravel Co. This is a steam-driven 10-in. (Amsco) pump unit.

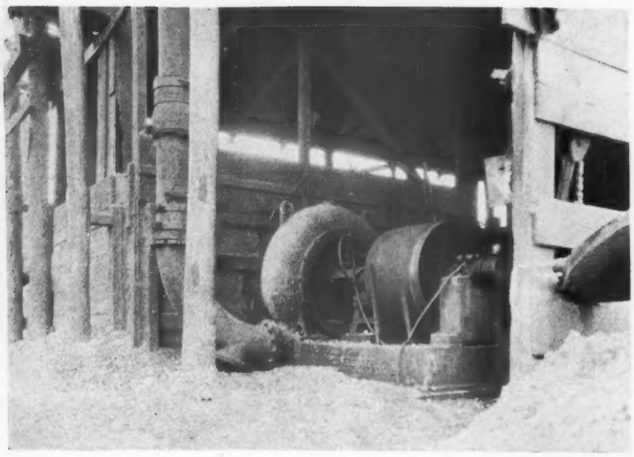
Possibly a half-mile from this operation is the old plant of the J. W. Thompson estate which is not now active.

Brick Company Operating

The American Brick Co., which also manufactures sand-lime brick in New Orleans, has a dredge operation at Price, La. This company also markets sand and gravel, the sales being handled through the Materials Service and Development Co. The operations at Price consist of a 10-in. Bennett pump driven by a 150-hp. vertical type, Worthington Diesel engine. The pump delivers to stationary screens located on the shore. The screening practice is similar to the others in the district.

Three other operations that are now part of the Flint Sand and Gravel Co. are the former Hammond Gravel Co. This operation near Fluker, La., uses a 6-in. gasoline-engine-driven pump. A second operation is that of the former Amite River Sand and Gravel Co. at Denham Springs. This operation was said to be moving its equipment to a new location near Jackson, La.

Jahncke operation, Roseland, La. (A) Suction dredge which delivers to relay dredge (C), which serves the plant. (B) Accumulated sand and gravel from the more distant dredge



At the Dear and Johnson operation at Amite, La., the 10-in. pump delivers to a small screening plant, where most of the sand is removed and the gravel returned to the pond

The third operation is that of the Bogue Chitto Gravel Co., Franklinton, La., where a 10-in. Diesel-driven unit is in operation.

New Plants and Projects

There are several companies in the promotional stages in the eastern section of Louisiana. The largest and the only one that had really stated its construction program by April 15, when I visited this section, is the Consumers Sand and Gravel Co., with offices in the Louisiana National Bank building, Baton Rouge, La. This company is building two plants, one at Franklinton on the G. M. & N. railroad and the other plant at Flucker, La., on the Illinois Central railroad.

Both dredges will be equipped with 12-in. Morris pumps, incidentally being the first installations of this type in the district under discussion. The pumps will be electrically driven using 400-hp. induction motors and will discharge to a sump where a 10-in. Morris pump will deliver the material to the screening plant. Stationary screens similar to all those used in the district will be used. The pumps will be mounted on steel barges. The two plants are expected to produce 50 cars of gravel per day.

The deposits at Franklinton are said to have a higher gravel content than those at Amite or Roseland and will average 18 to 22 ft. in depth with an overburden of 5 to 6 ft., which will not be removed except by the dredging. At the time of inspection the framework for the Franklinton washer of the Consumers Sand and Gravel Co. was well under way.

The executive officers of the Consumers Sand and Gravel Co. are: W. L. Stevens, Jr., president, and J. F. Calmes, treasurer. The Louisiana Materials Co. will handle the sales of the new company's products. Mr. Calmes was for several years sales manager of the Holloway Gravel Co.

The Interstate Gravel Co., with offices in the Louisiana National Bank building, Baton Rouge, has been for years a shipper of clay-gravel from Bainey, Miss., but owing to the demands for washed material had practically ceased to function, but some of the owners are forming a new company, unnamed as yet, which will install a dredge and screening plant to be in operation some time early in July. S. T. Williams, Stephens, La., will be superintendent of this operation. The development of the new company's affairs now is mostly in the hands of A. W. Graham, Baton Rouge.

Will Mount Plant on Railroad Trucks

This company's deposit practically parallels the railroad spur through the property and it expects to mount a washing and screening plant on four standard gage railroad trucks which will ride four lines of rails, thus instead of moving the plant or relaying the material, the plant will be moved closer to the dredge. As the plants used in the district are all comparatively small this sounds like a perfectly feasible scheme. (In fact it is already common practice in Texas.) A 12-in. dredge driven by a Diesel unit will be used. The Deisel has been purchased from an old city lighting plant.

Another company said to be still in the promotional stages is the Profit Island Gravel Co., Baton Rouge, La.

Dear and Johnson loading plant

Recent Developments in the Phosphate Industry

IN A RECENT ISSUE of *Industrial and Engineering Chemistry,* K. D. Jacob discussed recent developments in the phosphate industry. Reference is made to the utilization of low-grade rock and to the direct application of colloidal phosphate to soil. Phosphate used as a mineral supplement in feeding stock must be of low F content. The manufacture of H_3PO_4 by both furnace methods and wet processes are commercially feasible. The manufacture of superphosphate, ammoniated superphosphate and triple superphosphate is discussed.—*Chemical Abstracts.*

Composition of Florida Phosphates

THE CHEMICAL AND PHYSICAL composition of certain finely divided natural phosphates from Florida are given in a study of composition of samples of soft and waste-pond phosphates from Florida. This study was made and reported by W. L. Hill, K. D. Jacob, L. T. Alexander and H. L. Marshall.

Data are included in this report on physical composition of samples, effect of temperatures on specific gravity, chemical composition of the original phosphates and the mechanical fractions separated therefrom, and the solvency of the P_2O_5 in neutral NH_4 citrate and 2% citric acid solutions.—*Chemical Abtracts.*

Allowable Percentages of Soft Material in Coarse Aggregate

Compression Tests on 6x12-In. Concrete Cylinders

By H. G. Groves

Testing Engineer, North Dakota State Highway Department, Bismark, N. D.

THE PURPOSE of this test is to determine how large a percentage of shale or soft rock (peculiar to the materials used in this state) may be safely used without a decided loss in strength.

We took a sand and a gravel and designed a mix using a water-cement ratio of 0.9, or 6¾ gal. of water per bag of cement.

All of the materials used in the mixes were weighed. A one-half bag mixer was used and 6- by 12-in. cylinders were made from the concrete as it came from the mixer.

The results obtained using various percentages of soft rock are as follows:

	28 day	6 mo.	1 yr.	% soft rock
	3992	4490	4200	0
	4046	4490	4420	0
	4046	4910	4730	0
	3357	4000	4170	0
	3816	4000	4200	0
	3710	4380	4170	0
	6/22967	6/26270	6/25890	
Average	3828	4378	4315	
	4134	4341	4770	2
	3939	4590	4310	2
	4152	4980	4660	2
	4064	4310	4346	2
	4099	4340	4558	2
	4134	4370	4346	2
	6/24522	6/26931	6/26990	
Average	4087	4489	4498	
	+6.76%	+2.53%	+4.24%	
	3834	4200	4346	4
	3728	3990	4480	4
	4028	4060	4550	4
	4064	4200	4270	4
	4187	4560	4590	4
	4223	4560	4240	4
	6/24064	6/25570	6/26476	
Average	4011	4262	4413	
	+4.78%	−2.72%	+2.27%	
	4081	4350	4380	6
	3904	4350	4480	6
	4011	4420	4310	6
	4028	4060	4100	6
	3728	4040	3890	6
	3746	3880	4240	6
	6/23498	6/25100	6/25400	
Average	3916	4183	4233	
	+2.29%	−4.66%	−2.17%	

It will be noted that below the average in each case (except where no soft rock is present in the mix) is a percentage. Referring back to the table, the average 28-day strength with 2% soft rock is 6.76% greater than the average 28-day strength with no soft rock. The average 28-day strength with 4% soft rock is 4.78% greater than the average 28-day strength with no soft rock. The average 28-day strength with 6% soft rock is 2.29% greater than the average 28-day strength with no soft rock. The average 6-month strength with 2% soft rock is 2.53% greater than the average 6-month strength with no soft rock. The average 6-month strength with 4% soft rock is 2.72% less than the average 6-month strength with no soft rock. The average 6-month strength with 6% soft rock is 4.66% less than the average 6-month strength with no soft rock.

The average 1-year strength with 2% soft rock is 4.24% greater than the average 1-year strength with no soft rock. The average 1-year strength with 4% soft rock is 2.27% greater than the average 1-year strength with no soft rock and the average 1-year strength with 6% soft rock is 2.17% less than the average 1-year strength with no soft rock.

Conclusions As to Use of Soft Rock

From the above results you will notice that the strength increases instead of decreases except at the end of the 6-month test with 4 and 6% soft rock and the 1-year test with 6% soft rock. The only reasonable explanation for this is that the absorption of the soft rock was not figured and consequently this loss in water cut down the water-cement ratio, thereby increasing the strength up to the point where the weakness of the large percentage of soft rock overcame the increase in strength caused by the loss of water by absorption. The above results indicate that we could safely permit as much as 6% of this particular type of soft rock without a decided loss in strength. However, since it is not definitely shown that this percentage of soft rock could be used without causing serious damage resulting from weathering, it would be preferable not to use more than 4%. Since the strength shows very little loss with 6% soft rock, it would be permissible to use a material with this large a percentage of soft rock in places where the concrete would not be exposed to the weather such as concrete bases for black top pavement, foundation walls when waterproofed, etc.

From the above results we would be justified in using various percentages of this particular type of soft rock in test pavement slabs, as this would be the most [illegible]r way to give it an unbiased test under weath[illegible]r and traffic conditions.

Soft Rock Defined

The particular type of soft rock used in the above test is a real dark brown in color. It appears to be a very solid rock when first examined. However, if this rock is exposed to the weather for a short period it will first check and then the outer shell will come off similar to a nut, leaving a very rusty colored kernel inside. This piece inside is sometimes soft and sometimes very hard.

Shale Tests

The results obtained using various percentages of shale are as follows:

	28 day	6 mo.	1 yr.	% shale
	3445	3890	3640	0
	3498	3990	3640	0
	3480	3710	3640	0
	3693	3960	4060	0
	3569	4170	4200	0
	3639	4350	.....	0
	6/21324	6/24070	5/19180	
Average	3554	4012	3836	
	3887	4250	4240	2
	3587	4300	4275	2
	3746	4270	4200	2
	3303	4140	4170	2
	3445	4250	4240	2
	3463	4060	3960	2
	6/21431	6/25270	6/25085	
Average	3572	4212	4181	
	+0.5%	+4.98%	+8.99%	
	3693	3890	4170	4
	3587	4060	3990	4
	3640	3960	3886	4
	3339	3960	3710	4
	3322	4240	4170	4
	3339	4010	4240	4
	6/20930	6/24120	6/24166	
Average	3488	4020	4028	
	−1.89%	+0.2%	+5.00%	
	2738	3110	3500	6
	2879	3140	3140	6
	3039	3170	3460	6
	3109	3570	3700	6
	3056	3000	3530	6
	3039	3500	3530	6
	6/17860	6/19490	6/20860	
Average	2977	3248	3477	
	−19.38%	−23.52%	−10.32%	

You will note that below the average in each case, except where no shale is present in the mix, is a percentage. Referring back to the table, the average 28-day strength with 2% shale is 0.5% greater than the average 28-day strength with no shale. The average 28-day strength with 4% shale is 1.89% less than the average 28-day strength with no shale. The average 28-day strength with 6% shale is 19.38% less than the average 28-day strength with no shale. The average 6-month strength with 2% shale is

4.98% greater than the average 6-month strength with no shale. The average 6-month strength with 4% shale is 0.2% greater than the average 6-month strength with no shale. The average 6-month strength with 6% shale is 23.52% less than the average 6-month strength with no shale. The average 1-year strength with 2% shale is 8.99% greater than the average 1-year strength with no shale. The average 1-year strength with 4% shale is 5.00% greater than the average 1-year strength with no shale. The average 1-year strength with 6% shale is 10.32% less than the average 1-year strength with no shale.

Conclusions As to Use of Shale in Coarse Aggregate

From the above results you will notice that the strength increases instead of decreases, as it naturally would be supposed except at the end of the 28-day test with 4 and 6% shale and at the end of the 6-month and 1-year test with 6% shale. The only reasonable explanation for this is, the absorption of the shale was not figured and consequently this loss in water cut down the water-cement ratio, thereby increasing the strength up to the point where the large percentage of shale overcame the increase in strength caused by the loss of water by absorption.

From the above figures we find that 4% of shale may be used without any decrease in compressive strength. However, since the above results do not show the effect of weathering on shale it would not be safe to allow 4% until tests have been made in pavement slabs, using various percentages of shale, to determine the effect of traffic and weathering. We believe that the above compressive tests justify us in desiring such a test in pavements.

The above results show that we could use 4% shale in a material without serious results to strength in places where the concrete would be protected from weathering action, for example, the concrete base for black top pavement, waterproofed foundation, etc.

Refractory Clays in Calhoun and Pike Counties, Illinois

A REPORT OF A STUDY of "Refractory Clays in Calhoun and Pike Counties, Illinois," report of investigations No. 22, has just been issued by the Department of Registration and Education, a division of the State Geological Survey.

The report was made because the clay resources of these counties have not participated in the general development of this industry enjoyed in other sections of the state. Five areas are discussed. The location and occurrence, geology, clay resources and ceramic properties and the possibilities of development of each area are given. Those interested in this subject will find this a valuable publication.

Notes on Hydraulic Dredge Operation

O. P. ERICKSON, who is engineer for the Great Lakes Dredge and Dock Co., Chicago, Ill., writes in a recent issue of *Engineering News-Record* on hydraulic dredge operation. He gives directions and data for contractors' dredging, but much of it might be followed to their advantage by operators of sand and gravel dredges.

The first thing good dredging practice calls for, he says, is a thorough examination by boring of the area to be dredged. This is quite as important in dredging for gravel as in contracting work, yet it is too often omitted, sometimes with disastrous consequences. But this alone is not enough, for he says: "A thorough study is required of what section or cuts are to be dredged first, the most suitable width of cuts for the dredge to be used, the depth of water, the current conditions, and the interference to pontoon lines from passing boats." These are to be plotted on the general plan of the project.

It is the author's opinion that the economical size of dredge depends on the length of pipe line. With pipe lines over 4000 ft. a 27- to 30-in. dredge is recommended; with pipe lines less than 4000 ft. and fill depths less than 10 ft., the 15- to 24-in. dredge can do the work more economically. The greater number of gravel dredges built today for large tonnages work through shorter pipe lines than these and have from 15- to 20-in. pumps, agreeing with this opinion.

The advantage of having enough men on the job to take care of repairs and changes quickly is pointed out. A large contracting dredge can earn $120 an hour, and minutes count. Of course this applies to dredges that work 24 hr. in three shifts, but on any dredge where changes have to be made in working hours it pays to have enough men around to make them quickly. The bonus plan, which is followed by many sand and gravel operators, is approved. The article says: "It gives the men an extra incentive to work and makes everyone eager to reduce delays and get the highest possible output." A skilled superintendent is necessary and the article says that "He should be a man with plenty of foresight, common sense and practical engineering experience. He must be able to obtain from his operators the greatest output possible from the dredge, to reduce the time of the unavoidable delays to a minimum, and to avoid unnecessary delays."

Speed, of course, is all important in operating a large contracting dredge, and trained men can make changes and repairs in a remarkbly short time. Thus, it is stated that the average time for adding a 50-ft., 20-in. pontoon section is not over 10 to 15 min. and for a 50-ft., 30-in. section not over 25 to 40 min. The time for renewing a swing or a spud cable is given as two hours. To clear a suction by opening the manhole on the suction pipe requires about 10 min. on the smaller dredges and 20 min. on the larger. To save time in doing this work means are provided for quickly emptying the discharge pipe; a swing gate check valve or a plain gate valve in the pipe near the stern of the dredge is recommended.

It is noted that "a number of prominent dredge contractors have the suction pipe installed above the water line of the dredge." This is because the valve that has to be installed in the suction inside the dredge generally gives trouble from leaking in the stuffing boxes and flanges.

The advantages of a submersible pipe line (a comparatively new idea) over a floating pontoon line are summed up: "It is not affected by wind, wave or current action, as is the floating pontoon line. It can be moved from one location on a job to another almost as quickly as the pontoon line. . . . In busy harbors the submerged pipe line eliminates interruptions to the dredging operations from passing boats. The length between ball joints varies with the conditions of the bottom; 150 ft. is perhaps the average"

Regarding the outputs of contracting dredges it says: "Generally, in pumping sand the 1200-hp., 20-in. dredge will handle 1000 cu. yd. per hour through 2000 to 3000 ft. of pipe line. . . . The 3000-hp., 30-in. dredge will handle about 2000 yd. per hour through 5000 to 6000 ft. of pipe line with an average velocity between 16 and 18 ft. per sec. . . . In pumping hard clay the above output may be cut to about one-third, and pumping gravel may cut it to about one-fourth. That is, in pumping sand through 5000 ft. of line the 24-in. dredge will handle about 30,000 cu. yd. in 22 hours; pumping clay it will handle about 10,000 yd., and pumping gravel, about 7500 yd." The output pumping gravel seems low for so large a pump as compared with the work of sand and gravel dredges. Assuming a 16-ft. pipe line velocity, it figures that about 5% of solids are pumped, which is lower than would satisfy most sand and gravel operators. However, sand and gravel operators do not pump through long lines without boosting.

Hi-Rock Products Makes Improvements

THE HI-ROCK PRODUCTS CO. is improving methods and equipment at the rock-crushing mills, Marengo, Ind., to materially increase present production capacity of 500 tons of crushed rock per day, A. H. Mann, secretary, stated recently.

Gas-operated shovels and a motor truck fleet will supplant the conveyor system now in use, and the mill will be so equipped that 15 men will be able to operate it at maximum capacity.

The plant furnishes crushed rock in various sizes for use in highway construction to contractors. Improvements for the increased production program were to have been completed by April 23.—*Evansville* (Ind.) *Journal-News.*

Progress in the Application of Electrical Precipitation to the Cement Industry

By H. A. Schaffer
Consulting Engineer, Western Precipitation Co., New York, N. Y.

THE DUST PROBLEM has long been considered of very great importance by cement manufacturers.

The Committee on Conservation of the Portland Cement Association has several times in its yearly programs included the study of dust collection—description of different methods and equipment for handling the dust which escapes from kilns, dryers, grinding machines and cement packers, together with operating results of the various types of collectors. At one of the meetings of the association an interesting symposium on dust collection was participated in by cement company representatives and manufacturers of dust-collecting equipment.

The problem always confronts the cement manufacturer who has not taken steps to prevent the escape of dust, or who has not installed apparatus for its collection. In the opinion of the writer the time is not far distant when industries will be obliged to stop the pollution of the atmosphere with fume- and dust-laden gases. They will also voluntarily collect the dust which escapes from crushing and grinding units, thereby making their plants cleaner and safer and more healthful for workmen. These results will be accomplished with less wear on machinery and an over-all improvement in plant operation.

Electrical precipitation of the dust leaving kilns and dryers has played an important part in the progress made in the cement industry in recent years.

Installed in 42 American Plants

The total number of Cottrell installations which have been built or are under construction in North America is 388. Of this number 42 are in portland cement plants, or less than 11% of all industries using the process. However, when it is considered that the first installation in the cement industry was made in 1913, and that prior to that year practically no effort was made to collect the dust escaping from cement-mill equipment we believe that 42 separate installations represent substantial progress in electrical precipitation in that particular field.

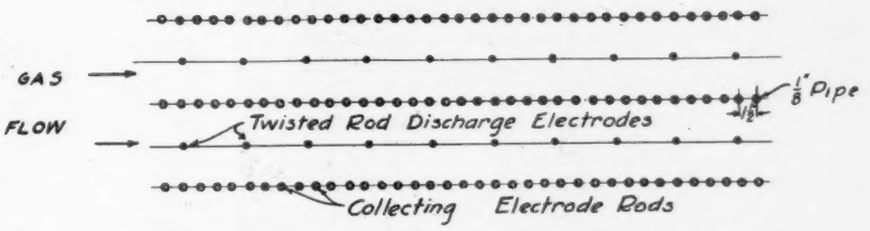


Fig. 2. Arrangement of electrodes in rod curtain precipitator

Of interest in connection with the foregoing data it should be stated that kilns equipped with Cottrell precipitators in the United States have a productive capacity of over 110,000 bbl. of clinker per day. The following table shows the diversified application by industries of the installations:

TOTAL COTTRELL INSTALLATIONS BUILT OR UNDER CONSTRUCTION IN NORTH AMERICA

Cement	42
Metallurgical	161
Acid-Mist	72
Detarring	76
Chemical	15
Central power stations	11
Paper mills	2
Miscellaneous	9
	388

An item of general interest which shows the growth and acceptance of these processes over a period of 18 years is the total number of installations made in all countries, namely, 1223.

WORLD DISTRIBUTION

United States	350
Canada	25
Mexico	13
South America	8
Europe	804
Australasia	6
Japan	15
Dutch East Indies	1
Dutch West Indies	1
	1223

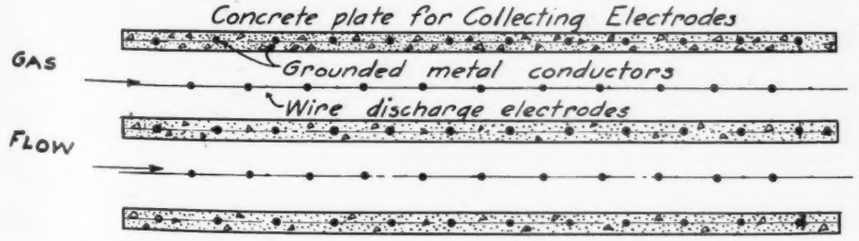


Fig. 1. Arrangement of electrodes in graded resistance precipitator

This process is especially adapted where high efficiencies are desired, it being entirely feasible to design and construct a precipitator to collect 90% or more of the suspended particles in any gas stream according to the requirements of each individual plant.

Best Type for Cement Plants

The type of precipitator best adapted to any plant is determined after a study or investigation of local conditions, whereby data are obtained relative to gas volume, dust concentration in the gases to be treated, temperatures, analysis and quantities of raw mixture, and fuel. The precipitator installed in most cement plants during the past five years is known as the "graded resistance" type, named from the character of the collecting electrodes, which as installed in the cement industry are usually composed of carefully prepared portland cement concrete. These electrodes are made either of portland cement and blast furnace slag grits or portland cement and washed silica sand carefully selected, thoroughly mixed and cautiously placed so as to avoid segregation or air spaces.

In the older type of metal electrode precipitator the collected dust adhering to the electrode often caused electrical disturbances. To prevent an excessive accumulation of the precipitated dust on the electrode, each precipitator section was cleaned at frequent intervals; first shutting off the dampers and then rapping the electrodes by means of mechanical rapping devices. The "graded resistance" type of electrode functions normally notwithstanding the accumulation of dust, as the dust falls off by reason of its own weight.

This type of electrical precipitator was developed especially for plants with waste-heat boilers, where the temperature of the gases leaving the boilers or economizers is less than 450 deg. F.

This same apparatus can be installed in both wet and dry process plants not equipped with waste-heat boilers by cooling the gases

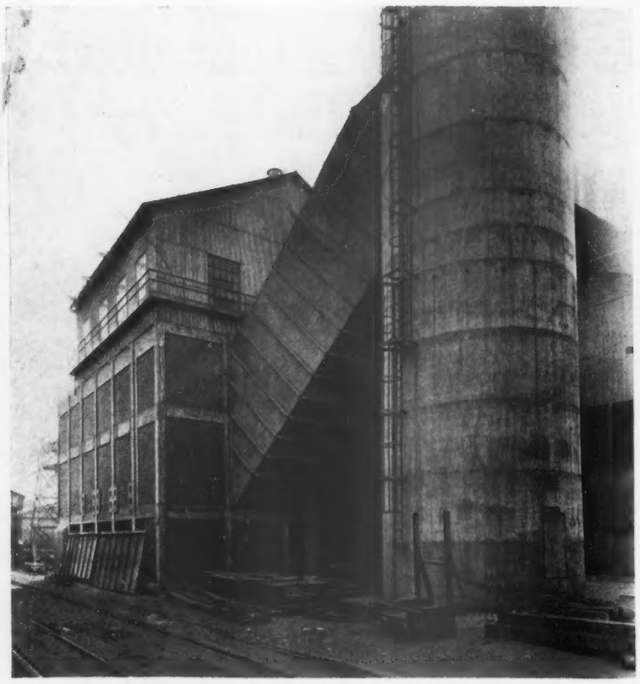


Fig. 3. Completed installation of graded resistance precipitator, Buffington plant, Universal Atlas Cement Co.

either by means of radiation coolers or with water spays. In the older types of precipitators, the collecting electrodes were made of metal and were electrically grounded. In the "graded resistance" type, electrodes are of rather poorly conducting materials, and electrical grounding is accomplished by placing the maximum amount of resistance in series with the minimum air gap, and the minimum resistance in series with the maximum air gap.

Iron-Plate Electrode Modified

Another development of recent years, a collecting electrode designed for use in connection with the treatment of smelter gases where corrosion is of major importance, and which finds useful application in the cement industry, is a modification of the older type of iron-plate electrode. The plate electrode is replaced by a curtain of rods or small diameter pipes of approximately 0.4-in., which are placed sufficiently close together to act electrically as a continuous electrode. The parts are mechanically separated, eliminating any tendency to warp, and these electrodes are made up to 18 ft. in height. They are easily cleaned by an air hammer device, either automatic or semi-automatic, and by virtue of their construction the individual pipes are readily and cheaply replaced by new ones should corrosion set in.

This type of collecting electrode has been designated "rod curtain" and has been installed in a number of cement plants not equipped with waste-heat boilers, where the exit gas temperature ranges from 1000 deg. F. to 1100 deg. F. This "rod curtain" precipitator can also be substituted for the "graded resistance" type in the treatment of lower temperature, dust-laden gases from waste-heat boilers.

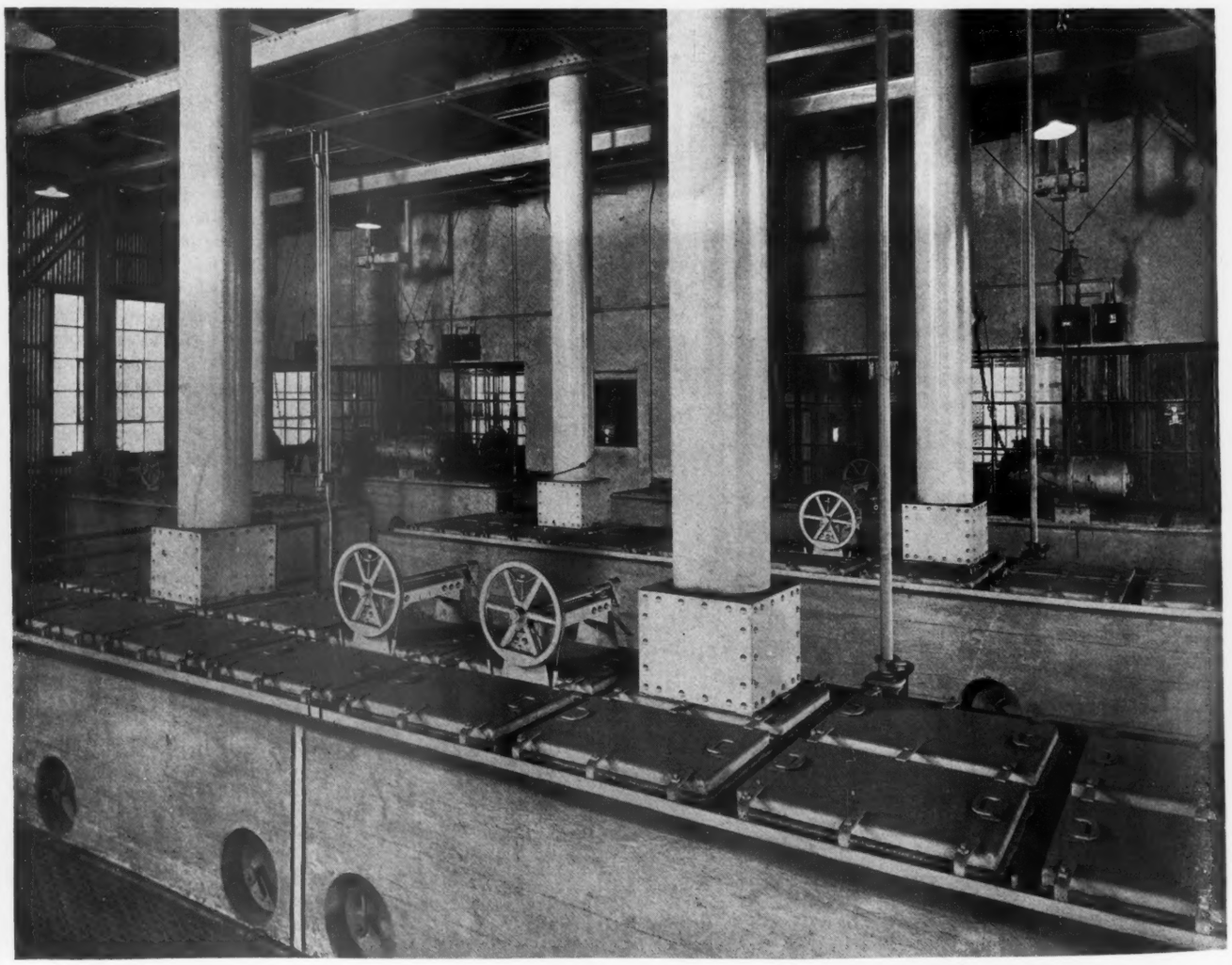


Fig. 4. View across the top of precipitator shown in Fig. 3

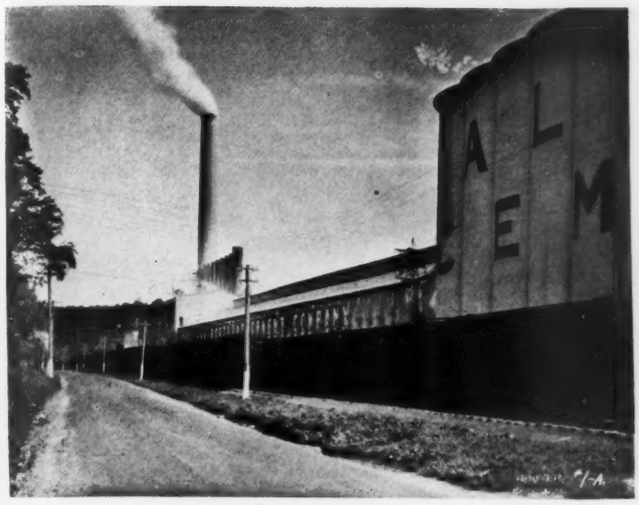


Fig. 5. Gases leaving stack, plant No. 4, Alpha Portland Cement Co., Martins Creek, Penn., before applying current in precipitator

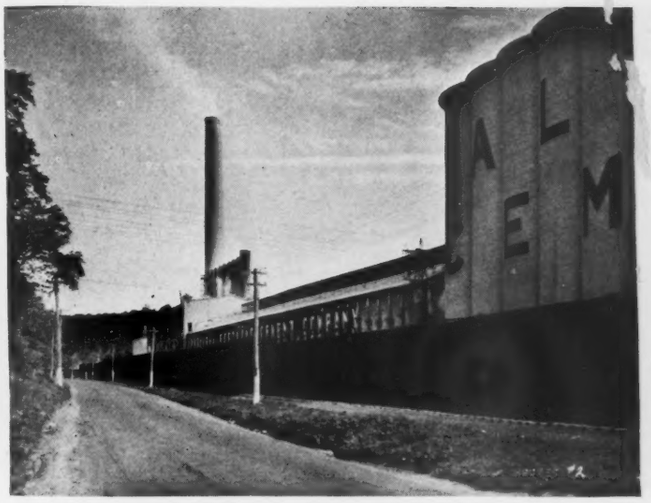


Fig. 6. View of same installation with precipitator equipment in operation

The advantage of the "rod curtain" type in so far as the cement industry is concerned lies principally in the handling of kiln gases of higher temperatures than is possible with the "graded resistance" or concrete type of collecting electrodes. While it is true that where proper provisions are made for cooling the gases, the "graded resistance" type is applicable to both wet and dry process kilns not connected to waste-heat boilers, there are many plants where the "rod curtain" treater can be used without installing cooling apparatus to lower the gas temperature.

Advantages of "Rod Curtain" Type

This new type of electrical precipitator thoroughly lends itself to the collection of dust from kiln gases in plants, which for economic reasons or simplicity of operation employ purchased power. The exit temperature of gases from the longest kilns operating at the present time where the heat in those gases is not utilized to generate power or for drying purposes, exceeds the maximum temperature to which the "graded resistance" type of electrode should be subjected. It is in connection with kiln equipment of this kind that the "rod curtain" precipitator will find its chief application.

In describing this new type of precipitator, it should be mentioned that the same principle of electrical precipitation is used as was employed in the older types of Cottrell precipitators, namely, iron-pipe electrode, iron-plate electrode, and graded resistance electrode precipitators. Briefly, the dust-laden gas is passed through a high potential unidirectional electrostatic field between two oppositely charged electrodes, one of small area, called the discharge electrode, the other of larger area, called the collecting electrode. The unidirectional current is supplied by rectifying high tension alternating current. During the process of treatment, the individual suspended particles of dust are electrically charged and are driven toward and deposited on the collecting electrodes.

Disposal of Dust

The accumulated dust falls of its own weight from the graded resistance type of electrodes into hoppers below and is returned at the option of the cement company either to the kiln elevator or to the raw material blending bins by means of screw conveyors. Mechanical rapping devices, operated periodically, are necessary on the rod curtain type to remove the deposited dust. The cleaned gases pass on through the apparatus to the stack and atmosphere.

The measurement of the total quantity of dust which is lost from kilns operating on many different raw materials throughout the United States has shown this to be an exceedingly variable amount. Factors exerting an influence on the variation in percentage of dust are:

Velocity of gas in kiln.
Construction of kiln and connecting equipment.
Method of feeding the raw mixture.

Dust loss per barrel produced also depends on the physical and chemical characteristics of the raw material. It appears that certain raw materials having a high magnesium content cause excessive dusting, due presumably to decrepitation in the kiln. For these reasons, it has been found that

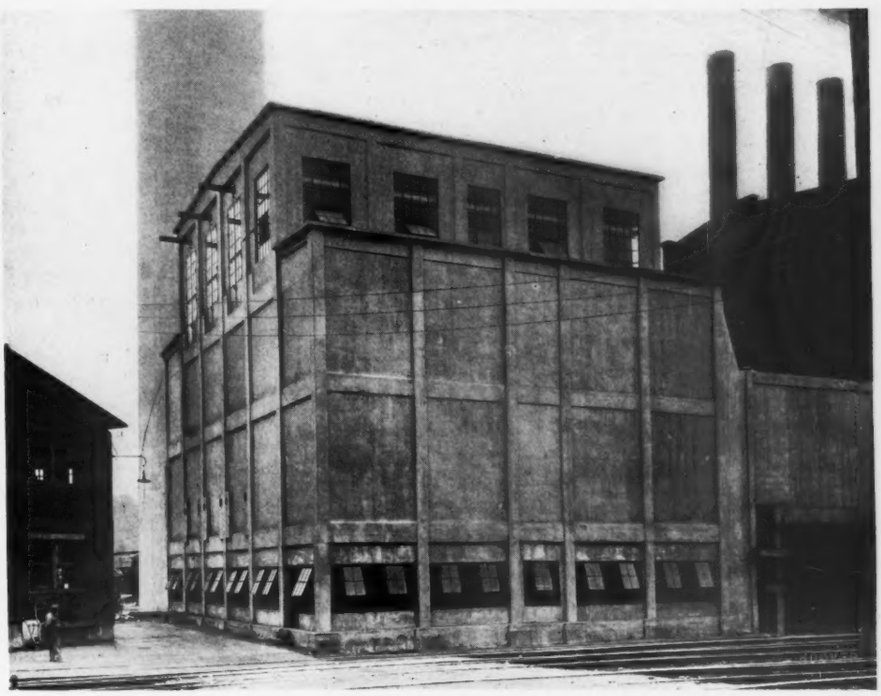


Fig. 7. Typical concrete structure, housing precipitator installation

Fig. 8. Operating control room, showing switchboard and rectifier sets

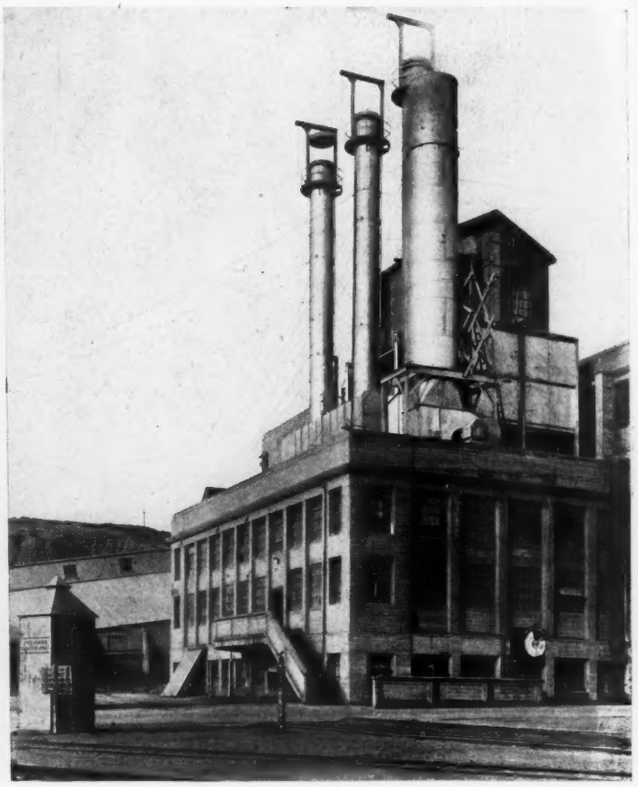


Fig. 9. Typical steel structure, housing precipitator installation

some wet-process kilns have a higher dust loss per barrel of clinker burned than is shown in certain dry-process kilns.

The type and capacity of a Cottrell precipitator to handle these gases is practically independent of the amount of suspended particles in the gases, but it is directly dependent upon the volume and temperature of gas to be treated, and on the efficiency desired.

Advantages of Latest Types of Precipitators

The improvements mentioned earlier in this paper, as applied to the newer types of precipitator over the original iron-plate and iron-pipe electrode precipitators are summed up in the following advantages:

Smaller spaces and structure required for treating the gas volume.
Lower cost of installation.
Lower power consumption.
Lower labor costs.

It should be noted, however, that the operating efficiency of the earlier installations compares very favorably with the newer designs of precipitator.

In this connection it is of interest to relate that the first electrical precipitation equipment in the cement industry, which was made at the plant of the Riverside Portland Cement Co., has been in continuous operation ever since 1913 without alteration and with only minor repairs. Throughout that period these treaters have collected between 95% and 98% of the dust entering them, which expressed in terms of weight would approximate 500,000 tons of dust held from vitiating the atmosphere.

It is difficult to visualize large quantities of dust emitted from industrial stacks over a certain period of time, as no appreciable amount of the finely divided solids is deposited in any given area for a considerable length of time. Velocity and changing direction of winds, varying heights of stacks, et cetera, cause dissemination of the suspended matter over a large area. For that reason cement manufacturers sometimes cannot realize the extent of their daily dust losses when expressed in ton weights or pounds per barrel of raw material entering the kiln.

On a percentage basis kiln dust losses average 6% to 8% for the entire cement industry and may vary from 3% to 20%. With an average valuation of $1.00 per ton of the recovered dust, it is evident that a precipitator which collects and returns to the system between 90% and 98% of the dust will pay for its maintenance and leave a substantial operating surplus to apply against the investment.

Operating Costs

Power consumption, labor expense and repairs are very low on graded resistance and rod curtain electrode precipitators. In placing a valuation of $1.00 per ton upon the recovered dust the whole cement industry has been taken into consideration, it being recognized that some companies, due to natural advantages with quarries adjacent to mill site and with all charges including mill overhead, deliver finished raw material to their kilns at a cost below this figure. There are many cases, however, where one or more raw material ingredients are purchased and transported a considerable distance to the plant, which when mixed and prepared for kiln feed are worth considerably more than $1.00 per ton.

The dust collected from a Cottrell treater and conveyed to the kiln elevators replaces a like tonnage of rock, which has been quarried, crushed, dried, and pulverized. It is also largely calcined which adds to its value and necessitates only a slight correction in lime content of the raw mix, as the dust is fed continuously the entire 24 hours.

Treatment of Mixed Kiln and Dryer Gases

A number of installations successfully treat mixed kiln and dryer gases in one centralized dust precipitation apparatus. The moisture in dryer gases, particularly in the winter season, prevents the collection of dry dust, as these gases were formerly handled alone; when mixed with the high temperature kiln gases of larger volume in a precipitator, the moisture is maintained in gaseous form, while dry dust is always removed from the hoppers below the precipitator units. This method also has the advantage of including mill equipment and connecting flues to various sources of dust in all manufacturing departments and thus makes cement plants clean and as free from

dust as many other industrial operations, and also centralizes and simplifies the dust collection and handling problem.

The Cottrell processes of electrical precipitation for removing suspended particles from gases have been successfully applied to many cement, metallurgical, and chemical plants. Constant, intensive research work has developed many improvements and refinements in the art of precipitation until today the apparatus is considered highly efficient and standard equipment in various industries throughout the world.

Users of the Cottrell process have benefited by the improvements in the apparatus and methods for electrical precipitation, which have resulted from many years of research and study by the technical staffs and engineers of Western Precipitation Co. and associated organizations. This work is also conducted with the aim of further enhancing its usefulness to industry, whereby gas cleaning problems can be advantageously and economically handled by electrical precipitation.

New Use for Lime

EXPERIMENTS with artificial fog as a protection against frost have shown favorable results in Germany.

Drums containing unslaked lime are placed around the territory to be protected, and when frost warnings come, a mixture of sulphur trioxide and chlorine sulphonic acid is dripped onto the lime on the windward side of the garden or nursery. This generates a heavy fog which forms a protective blanket over the ground.—*Chicago* (Ill.) *Tribune.*

To Be Limestone Year

THIS IS A limestone year, judging from the number of Iowa farmers who are ordering limestone, getting ready for the growing of a soil building crop next year. More limestone is being ordered this year than any time in history of the usage of agricultural limestone. Farmers say they are getting limestone so that they will have pasture in dry seasons, for last year taught them that blue grass pasture would not handle a great deal of livestock and that their neighbors who had sweet clover and alfalfa got through the summer in fine shape.—*Knoxville* (Ia.) *Express.*

Purchase Gravel Deposit

THE SALE OF A TRACT of land in White River township by Isaac Woodruff to the Hamilton-Tipton Gravel Co. indicates that this newly organized concern is coming to Hamilton county for its gravel. The company is composed of men in Tipton and Hamilton counties and it is said they are going into the gravel business on a large scale. It is reported also that they have other pits in mind to purchase, all located in this county.—*Noblesville* (Ind.) *Ledger.*

Granville, N. Y., Slate Quarry Operator to Help Rebuild His Town

WITH $50 IN HIS POCKET, Hugh G. Williams in 1898, a lad of eighteen, left his home in England and set out for America, believing it a "land of promise."

Today at fifty, he is mayor-elect of Granville, N. Y., sole owner of a $500,000 slate industry, and a firmer believer than ever in "America as a land of promise." "Not only is America a land of opportunity, but also Granville, this village of 4000," he declares.

To prove that faith, he is offering as an inducement to bring new industries to the village, 1000 acres of privately owned property. "I will give it to them free," he said.

With the fate of Granville resting in a single industry, slate quarries, the mayor aims to bring to the village diversified business.

On a platform of "work and prosperity," Mr. Williams defeated the regular mayoralty candidates by an overwhelming majority. Running on an Independent-Progressive ticket, he piled up a vote that exceeded the total polled by the Republican and Democratic candidates.

Recently the village which he is to lead for two years was swept by one of the most devastating fires in northern New York's history. While Mr. Williams was not officially mayor until April 1, the fire was a challenge to him.

Busy in this office across the street from where the fire leveled a block of the business section, Mayor Williams mapped a comprehensive reconstruction program.

"I am offering 1000 acres of my privately owned land to any industries that will locate here," he promised.

He is not going to stay at home with his offer. He is going out to "get the industries."

While the mayor of Granville has felt the depression he has managed to keep his slate quarries opened during the entire slump.

"During the winter I kept a force of 75 men busy in the quarries. Now I am putting on an extra force of 50. I believe the country is coming back to its feet. My slate industry is doing as well, if not better, than it did a year ago."

Mayor Williams is earnestly attempting to live up to his campaign slogan—"If you want to put Granville on its feet again vote for Hugh G. Williams." He is going to put the village back on a prosperous foundation by giving the natives work. If there isn't work for them now, he will seek to bring work to them.

"One of the first things I want to do is to bring some industry here that will be attractive to the young men growing up in the village. Qurrying slate is not too attractive and the best blood in the community is going elsewhere to seek opportunity. The only way we can offset that is to bring to this village industries which will offer attractions to them.

Asked how he could afford to offer his property free to industries, he said firmly, "I would rather do something worth while with my money while I am alive than wait until I am dead to have it spent."

Mayor Williams owns six large quarries with main offices in Granville. He has several in Vermont and one in Georgia.

First Venture in Politics

This is Mayor Williams' first adventure in politics. To him it is an adventure, as much as coming to America years ago.

He became a candidate in one of the most hotly contested campaigns Granville has experienced in years. It was a campaign in which progressiveness was advocated against party loyalty, Mr. Williams being an enrolled Republican. His candidacy came quite innocently to him. He never thought of entering politics, in previous years refusing to become a candidate for local and state offices. His friends urged him to enter the arena, and he accepted because he saw in it an opportunity to work for a greater Granville.

Born in England, Mr. Williams came to America when he was eighteen. He came as a slate worker. He is Welsh by birth, as are a great majority of the working staff in the slate quarries. Most of them come from families in Wales that have been identified with quarrying in that distant land for years.—*Albany* (N. Y.) *News and Journal.*

Research in St. Louis

TWO RESEARCH PROJECTS have recently been undertaken by the St. Louis members of the National Sand and Gravel Association to gain additional information on the characteristics of coarse gravel aggregates.

The first project is a comparison of Class B and C gravel combined in a concrete mixture so that the absolute volumes of all the constituent parts are equal. It is intended to determine the strength of beams and cylinders, the slump, flow and density, and the workability by observation, and thus learn whether or not these two materials can be used satisfactorily in the same mixtures with equal results, the small difference in size making such a possibility.

The second project is to determine the variations in voids and the relative economies of various modifications of Class A aggregate. In doing this, Class A aggregate which meets the middle of the new specifications will be separated into three sizes, ⅜-in. to No. 4, ¾-in. to ⅜-in., and 2-in. to ¾-in. These sizes will then be recombined by 5% variations up to those percentages permitted by the specifications, and the percentage of voids determined and plotted on a tri-axial diagram, the result indicating the economy of those mixtures permitted by the standard specifications.

Foundrymen Discuss Sand

American Foundrymen's Association Has Special Session on Sand and Several Sand Producer Exhibitors

THE SESSION of the American Foundrymen's Association on sand research held in Chicago, Ill., May 5, was well attended.

The first paper presented, "Some Observations on Preparation and Use of Synthetic Sands," was given by L. B. Knight, sales engineer, National Engineering Co., Chicago, Ill. A synthetic sand was defined by Mr. Knight as one to which a commercial bond has been added to the silica grain to give it the required bonding strength. He said with synthetic sands it is possible to obtain more uniform sand size.

Quality and quantity of clay and moisture percentage may be controlled in synthetic sand. Also the usual amount of impurities found in natural sand are absent from synthetic sand. He also said the fire-clays used for bonding have a fusion point approximating 3000 deg. F., while clay in most natural bonded sands will fuse at temperatures several hundred degrees below this figure.

The machine best adapted to produce synthetic sands is the batch-type muller. Well coated sands which may be produced in this manner require less bond for adequate strength. The less bond used results in greater permeability.

Mr. Knight advised starting a rebonding program with facing sand. This involves a relatively small amount of material and still serves to properly educate the workmen in the plant. Standards should be established and records of results kept. It has been found that a much smoother casting results if the pattern is faced. However, the present trend seems to be to make all sand of facing quality. In the past, Mr. Knight said, too much attention has been given to the conveying and distribution of sand and not enough attention has been paid to its condition.

Briefly, the rules for successful use of bonding sand requires that proper standards of permeability, bond strength and moisture be established and that these standards be maintained with as little variation as possible. This demands the close attention of those in charge of the sand. Wherever possible frequent tests of the quality of the sand should be made and the result of these tests tabulated and distributed to all foremen to assist them in their control. He said it was essential that close co-operation be maintained between laboratory men and foremen.

In the discussion of this paper it was brought out that every system should have either an air separator or screening exhaust system to remove dust and fine sands.

Character of Sand Grains

The next paper, "Character of Sand Grains," was by Dr. H. Ries and G. D. Conant, Cornell University, Ithaca, N. Y. In this paper Dr. Ries told of microscopic examination of sand crystals. He said there are four classifications of sand shapes: (1) round, (2) angular, (3) sub-angular, and (4) compound. Sand deposits are formed by rivers, by wind as the sand dunes, on the ocean bottom and by the breaking down of rock formations. There is no relation between type of formation and shapes of sand grains. All types may be found in one deposit, though one type may predominate. Round shapes are found in the larger sizes while angular predominates in the fine sizes. Compound sizes are formed by the cementing of two or more grains with various natural cementing agents. The quality of these compound grains is variable.

There are four types of surfaces found (1) smooth, (2) pitted, (3) frosted and (4) glassy. The composition of sand is usually either quartz or silica. Other compositions are found, but in small quantities. Mineral grains are usually of a dark color and they are more easily fusible than silica sands.

In the discussion of this paper it was brought out that the character of the surface no doubt had a direct influence on the bonding and flowing qualities of sand, though no definite knowledge of this relationship has been proved.

In a discussion of the "Relation Between Sand Grains and Strength of Sand," Dr. Ries said tests on samples of round and angular sands had shown that, in mulling, the round grains roll better to give more complete clay distribution, while irregular distribution results with angular grains.

Permeability

This paper was followed by another on "Effect of Heat on the Permeability of Sea Coal Facing Sands and Core Sand Mixtures," prepared by Walter M. Saunders and Walter M. Saunders, Jr., read by Mr. Saunders, Jr. He said that in a previous paper it had been shown the permeability of molding sands containing moisture decreases on heating, irrespective of the class of the sand or the location from which it comes. At a fairly low temperature—around 200 deg. C.—the permeability is low. Around 300 deg. C. it increases before falling off gradually to a very low figure at 1000 deg. C. This break in the curve has been explained by the liberation of steam from the moist sand and by a small amount of gas from the decomposition of the organic matter in the sand.

This present paper was given, the author said, to describe the effect of a facing material containing sea coal on the permeability at different temperatures. The description of apparatus used and methods of conducting the test were given. The results of the tests were explained. The conclusions from the tests were that: (1) additions of sea coal to natural molding sands result in a diminution of permeability at room temperature, and this effect is still exerted on heating the sand after the volatile matter has been removed; (2) the volatile matter in sea coal, together with the swelling of the coal, is responsible for the effectiveness of sea coal in producing a smooth surface on a casting; (3) mixtures of molding sand and sea coal used as facing sands may vary considerably in proportions without changing the behavior of a given sand under heat; (4) core sands with binders, like natural molding sands, have progressively lower permeability when heated. The amount of binder does not materially affect this property.

Sand Grading

This paper was followed by Clarence E. Jackson, United States Bureau of Standards, who described a "Grain Distribution Index for Sand Grading." He said the Tyler and the calculative methods have received the most attention, both of which prove rather cumbersome to use. The method described by Mr. Jackson is briefly as follows: From the sieve analysis of the grain material, determine the grain fineness number. Determine the sieve number which is closest to the grain fineness number. In case a grain fineness number is found equidistant from two sieve numbers, it is considered to be closest to the lowest sieve number. Assign the number 0 to the sieve number next higher than the sieve number just determined. Assign numbers 1, 2, 3 and so on, to the standard sieve numbers, counting in order away from the number 0. Multiply the per cent. of each grain size by these numbers, add the figures thus obtained and divide this sum by 100, the total per cent. of sand in the sample. This result, multiplied by 100, gives the grain distribution

index of the sand sample. This method is illustrated in Table I.

TABLE I—CALCULATIONS FOR DETERMINING GRAIN DISTRIBUTION INDEX OF SAND

Sieve No.	Per cent. passing	Assigned number	Product
20	0	4	0
30	5	3	15
40	18	2	36
50	25	1	25
70	30	0	0
100	14	1	14
140	6	2	12
200	2	3	6
270	0	4	0
—270	0	5	0
Total	100		108

$$\text{Grain distribution} = \frac{108}{100} \times 100, \text{ or } 108$$

$$\text{Grain fineness} = 50$$

At the conclusion of this paper Dr. Ries gave a progress report of the research work. Completed work reported included the recommendation of the subcommittee on how to construct core ovens, the completion of the third edition of the pamphlet on tests and the recommendation for improved grips to use in tensile tests.

Distilled Water Recommended

Dr. Ries said difficulty had been experienced in getting accurate results in fineness tests. This trouble had been traced to the water used in testing. It was therefore recommended that distilled water be used in these tests. No final decision has been reached as to the best method of determining grain distribution. The present belief is that a calculated method, either that presented by Mr. Jackson, or another now being investigated, would be recommended. He also asked that when trouble is experienced with testing equipment recommended by the committee that it be taken up with them before condemning the equipment; that most failures were the result of incorrect operation. With some testing equipment the speed at which it is operated affects the result of the permeability and strength tests. The wide variation obtained in these tests has caused some producers to oppose selling to specification measured by present methods.

Sand Exhibitors

Samples of sand, cores and castings were much in evidence among the exhibits at the annual meeting of the American Foundrymen's Association.

Members of the rock products industry who had exhibits were: Albany Sand and Supply Co., Albany, N. Y.; Ayers Mineral Co., Zanesville, Ohio, which distributed an interesting illustrated booklet describing its operations and products; Great Lakes Foundry Sand Co., Detroit, Mich., with samples of a complete line of sands, silica flour, fire clay and a Birmingham coke which it distributes; Industrial Minerals Co., Columbus, Ohio; Kelly Graphite Mills, Inc., Stockertown, Penn.; Sand Products Corp., Detroit, Mich., with many cores showing the use of its sands in a wide variety of castings; Standard Silica Co., Chicago, Ill., exhibiting its various sands (and supplying comfortable seats for the weary); Superior Flake Graphite Co., Chicago, Ill.; White Rock Silica Co., Chicago, Ill., with samples of its Wisconsin district sands; and the Zanesville Sand Co., Zanesville, Ohio, which displayed its complete line of foundry sands and fire clay, together with an interesting exhibit of brass, ornamental and malleable iron castings made with their sands. The company's "Champion" brand of molding sand was featured. A display of about 600 samples of molding sands and minerals loaned by Eugene W. Smith was also on exhibit by the Association.

General attendance at the exhibit was reported lower than usual.

Complain Against Cement Rates

RAILROAD RATES on cement are attacked as unreasonable in two complaints filed with the California State Railroad commission.

The Blue Diamond Co., Ltd., with headquarters in Los Angeles, names the Atchison, Topeka and Santa Fe Railway Co., Southern Pacific Co., Los Angeles and Salt Lake Railroad Co., and the Pacific Electric Co., asserting that the carriers are charging unjust and unreasonable rates to transport cement from Los Angeles to points in southern California.

The California Portland Cement Co. declares that the Southern Pacific collects unreasonable rates for the transportation of cement from Colton to points in California.

Both concerns ask the commission to establish reasonable rates and award reparation on account of asserted ureasonable charges paid.—*Los Angeles* (Calif.) *Times.*

Limestone Producers in Texas Form Merger

THE SERVETEX Materials Co., combining four of the largest limestone producers in central Texas, has been organized in New Braunfels.

The board of directors consists of representatives of the Dittlinger Lime Co., Landa Rock Products Co., New Braunfels Limestone Co. and Charles Chaneseldt Co. of San Antonio. Officers of the new concern are: I. A. Ogden, of the Dittlinger company, president; Ernest Eikel, of Dittlinger's, general manager; Max A. Altgelt, of the New Braunfels Limestone Co., secretary-treasurer, and C. Westbrook, of Landa company, sales manager.

The concern will engage in the rock crushing business here and elsewhere. Other plans of the company have not been divulged as yet.—*New Braunfels* (Texas) *Herald.*

Reduced Asphalt Demand Met by Lower Output, Says Bureau of Mines

DOMESTIC DEMAND for petroleum and lake asphalt in the United States in 1930 fell 16% short of the demand in 1929 and 7.4% short of the demand in 1928. At the same time the production of asphalt by petroleum refineries decreased 14.8% from 1929 to 1930, and 6.3% from 1928 to 1930, according to preliminary statistics compiled by A. H. Redfield of the United States Bureau of Mines, Department of Commerce.

Imports, chiefly of lake asphalt and grahamite, were less than half as large in 1930 as in 1929. As production was curtailed to meet the reduced demand, stocks of petroleum asphalt held at refineries were only 3% larger on Dec. 31, 1930, than on Dec. 31, 1929. Prices of all grades of petroleum asphalt averaged 5.6% lower in 1930 than in 1929.

Similarly, sales of rock asphalt by producers in the United States were 11.2% less in quantity and 12.4% less in value in 1930 than in 1929. The average value realized for each ton sold decreased from $5.44 in 1929 to $5.36 in 1930. Seven-eighths of the total tonnage of rock asphalt sold was mined in two states, Kentucky and Texas. Less than half as much natural rock asphalt was exported from the United States in 1930 as in 1929.

No First-Aid and Mine-Rescue Contest

NO NATIONAL or international first-aid and mine-rescue contest will be held in 1931, it is announced by Scott Turner, director of the United States Bureau of Mines, Department of Commerce. The decision to forego the contest this year was influenced by a number of considerations not the least of which is the fact that the method of financing these noteworthy gatherings has not been satisfactory. It is hoped that by next year provision may be made whereby in the future the Bureau of Mines can adequately finance such events.

Since the Bureau of Mines came into existence in 1910, one of its numerous functions has been the sponsoring of national or international first-aid and mine-rescue contests which bring together about 50 first-aid and 15 mine-rescue teams from 15 or more states. The teams attending are usually the winners of company, district, or state contests and the trip to the national or international meet is a reward for expertness in first-aid or mine-rescue work.

The cost of the meet to the city in which it is held is approximately $5,000, as congress furnished no funds to pay for necessary expenditures.

"Old-Timer" in Stone Production Starts New Venture

A. E. Markgraf Builds and Operates the Plant of the Pontiac Stone Co., Pontiac, Ill.

By H. M. Fitch
College of Engineering, University of Illinois

THE OPENING of the new quarry and crushing plant of the Pontiac Stone Co. at Pontiac, Ill., has caused some little comment in the industry because it is the venture of a veteran of the crushed stone business and also because the location is outside of the usual limestone producing region of Illinois. A. E. Markgraf, who has been connected with stone quarries around Joliet, Ill., for many years, is the operator and part owner of the new company, and his son-in-law, L. E. Lamb, is associated with him in the project. These partners began their project last year when the site of the quarry was laid bare and the plant itself was started. The crusher house was completed about the first of the year and work of getting out stone was started on January 9.

The stone in this quarry is a good grade of limestone in a bed about 17 ft. in thickness. The upper portion of the deposit is brownish in color and the lower strata are greyish, although the chemical and physical characteristics of the stone are fairly uniform throughout. The rock is of a desirable composition for agricultural limestone and, moreover, is said to be an excellent "cement rock," although as yet no use of the stone for the latter purpose has been made. Since there are a number of cement plants in northern Illinois and the deposits of natural cement rock are limited, it may be possible to make some commercial development of this phase of the work. Mr. Markgraf has supplied the following table of composition of the rock as determined by tests:

Looking down on crusher and crusher platform. Pan conveyor is at the right

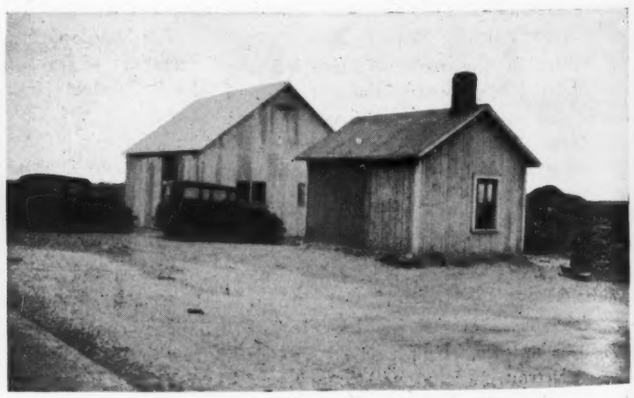
Silicon dioxide SiO_2	1.70%
Iron and aluminum oxides (R_2O_3)	1.30%
Calcium carbonate $CaCO_3$	94.88%
Magnesium carbonate $MgCO_3$	1.68%
	99.56%

Geologically, the rock is in the form of a dome which reaches the surface at this point and extends in all directions from the quarry site, dipping downward as the distance from the plant increases. Since rock in commercial quantities is unusual for this locality, it is profitable to open up the quarry even when the bed is less than 20 ft. in thickness. The surrounding territory is chiefly agricultural and the market for agricultural limestone alone was deemed sufficient reason for operating the plant. At present the company controls about 75 acres with the opportunity to acquire more.

Initial Method of Operation

There is an overburden of about 3½ ft., which is removed by a Link-Belt crawler dragline with a ¾-yd. bucket. At present the quarry has been opened up a short strip across the front of the plant, but this will rapidly be widened out as more stone is removed. The dragline is now loading the

Loading drill holes on upper quarry level



Shop and office at Pontiac plant

stone directly to the primary crusher so that the face necessarily must be close to the plant, but a belt conveyor is to be installed in the quarry shortly and the face will be at a greater distance from the plant.

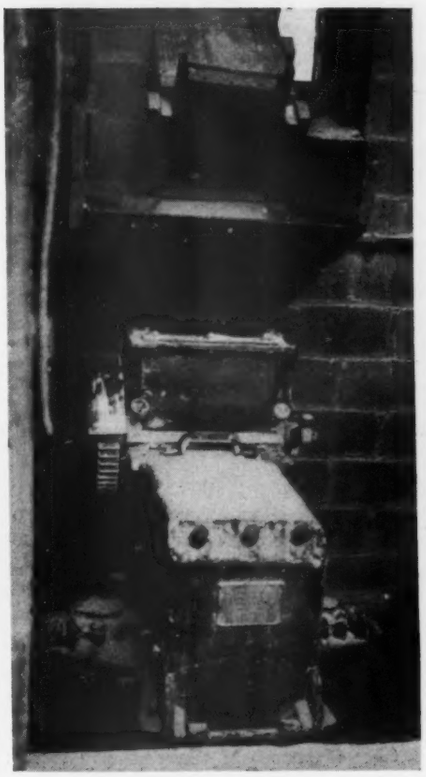
The quarry has been opened in two levels, but as the distance from the crusher becomes greater, so that there will be no danger of undermining it, the face will be worked for the complete depth of the formation, or about 17 ft. The practice now is to drill 9-ft. holes spaced 5 ft. back from the face and 5 to 6 ft. apart. These are loaded with 7 or 8 sticks of 1½-in. Illinois powder. The maximum number of holes shot at a time so far has been 54. The shooting has been very successful and a good uniform fragmenation has resulted. Gardner-Denver hammer drills have been used for putting down the holes, but when greater depth holes are started, it is planned to install a wagon drill. The company has little trouble with water in the quarry, and by using an American Well Works pump operating only about one-half hour daily, the pit is kept dry.

Crushing Plant

The crushing plant is not of unusual construction, except that for the lower floor the walls are of concrete block, set on poured concrete foundations. The siding of the upper floors is of corrugated iron. The portion of the building which is to house the primary crusher has not been built yet, although the crusher itself is in place. The reason for this is that at present the dragline is unloading directly to the crusher, but as soon as the quarry conveyor is installed this portion will be enclosed.

Mr. Markgraf and his partner designed the plant themselves, directing all the work during construction. The design embodies the ideas developed in years of association with the quarry business, so that the plant

Crusher platform in foreground



Recrushing unit beside main crusher

is simple in layout and easy to operate. The ease of operation can be judged by the fact that this plant with a capacity of about 500 tons daily can be efficiently operated, it is claimed, by four men and a superintendent. This includes the men in the quarry as well as in the plant itself. In fact the plant operation alone can be carried on by only one man, leaving one to run the dragline and two for drilling and blasting work.

The primary crusher is an Allis-Chalmers No. 5 gyratory feeding directly to the foot of a large pan conveyor. This conveyor extends to the very top of the plant, where it is driven by a General Electric motor through a Gilmore multiple belt drive. It delivers the stone to the uppermost of a pair of Lippmann vibrating screens. This vibrator acts as the scalping screen, the throughs passing down to the second screen, while the rejects are chuted down to a No. 2 Allis-Chalmers hammer mill beside the primary crusher. This hammer mill has operated efficiently and is capable of recrushing 25 to 30 tons per hour. A second conveyor from the hammer mill to the top of the plant returns the discharge to the scalping screen. This conveyor is also driven by a General Electric motor through a multiple belt drive. To increase the capacity of the plant, the installation of a cone crusher for recrushing is contemplated, but this may not be installed during the present season. The hammer mill can then be used for finer grinding for agricultural limestone.

The throughs from the scalping screen fall directly to the second Lippmann screen which separates the smaller sizes for "agstone" from the larger size for road work. A change of the screen wire on the vibrator permits the production of any number of sizes as desired. The bins are directly below the screens, so there is a minimum of chuting of materials about the plant and hence less wear and subsequent repair work.

There is a space beneath the bins for a single railroad track, although this has not yet been installed. Gates from the bins, with weighing hoppers manufactured by the Seaverns Engineering Co., will permit loading directly to the cars and trucks. The latter will use the same space as the cars. The grading has already been done for the siding from the Wabash railroad tracks, which are located beside the quarry property. This road is a branch line of the Wabash running east from Streator to connect with the main line beyond the quarry.

To complete the layout at the plant there is a small office building beside the crusher house and a shop where minor repairs can be made. The company does not operate its own trucks and so does not need a garage on the property. However, much hauling is done for the company, as a state concrete road passes directly beside the plant.

Up to Expectations

During the first seven weeks of operation this plant turned out about 5000 tons of stone, although there were many January and February days when the weather was too inclement to work at all. There were also the usual delays attendant on the first operations of a new plant, so that this record is good considering the handicaps. The plant is designed to produce 500 tons in a 10-hr. day and gives promise of exceeding this figure. It has already produced 287 tons of agstone and nearly 200 tons of road stone within a single day so that it is living up to the expectations. The market is largely for agstone at present, but as construction work increases a considerable amount of concrete stone will be produced.

New part will be added here

Researches on the Rotary Kiln in Cement Manufacture*

Part XIX—Weights of Dry Slurry Used and Weights of Carbon Dioxide and Moisture Expelled Therefrom in Producing Different Weights of Clinker

By Geoffrey Martin

D.Sc. (London and Bristol), Ph.D., F.I.C., F.C.S., M. Inst. Chem. Eng., M. Inst. Struct. Eng., M. Soc. Pub. Analysts, F. Inst. Fuels; Chemical Engineer and Consultant; Former Director of Research of the British Portland Cement Research Association; Author of "Chemical Engineering"

IN Part XV, we calculated the weight of clinker producible per 1 lb. of standard coal fired in the upper part of the kiln using different flame temperatures. In order to calculate the exit temperature of the resulting combustion gases and the heat balance of the kiln it is necessary to calculate the amount of dry slurry, expelled CO_2, water, etc., appertaining to the various amounts of clinker produced. This we will now proceed to do from the data given in Part X.

Calculation of Weight of Dry Slurry Which Produces a Given Weight of Clinker —In Part X it was shown that 100 lb. of clinker were produced from 156.03 lb. of dry slurry.

So that x lb. of clinker are produced by $1.5603x$ lb. of slurry.

In Part XV a table was given (Table I) showing the number of pounds of clinker theoretically producible per 1 lb. of standard coal fired in the kiln. By multiplying the number of pounds of clinker shown therein by the factor 1.5603 we obtain the weight of *slurry* from which it was derived, as shown in column (2) of the annexed table.

Calculation of the Weight of Carbon Dioxide Gas Evolved From the Slurry When Producing a Given Weight of Clinker —In Part X it was shown that in the production of 100 lb. of clinker 52.38 lb. of CO_2 were expelled from the slurry.

So that in the production of x lb. of clinker there were expelled 0.5238 lb. of CO_2.

In Part XV a table was given (Table I) showing the number of pounds of clinker theoretically producible per 1 lb. of standard coal fired in the kiln. By multiplying this weight of clinker by the factor 0.5238 we derive column (3) of the annexed Table I, which shows the weight of carbon dioxide evolved from the slurry when this weight of clinker is formed in the kiln.

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TABLE I—POUNDS OF DRY SLURRY USED AND POUNDS OF CARBON DIOXIDE AND MOISTURE LIBERATED THEREFROM IN PRODUCING DIFFERENT WEIGHTS OF CLINKER EXPRESSED IN POUNDS

(1) Lb. of clinker produced per 1 lb. of standard coal. W lb.	(2) Equivalent weight of dry slurry per 1 lb. of standard coal. $W\times1.5603$ lb.	(3) Lb. of CO_2 evolved from the slurry. $W\times0.5238$ lb.	(4) Lb. of combined water expelled from the kaolin in the dry slurry. $W\times0.0257$ lb.	(5) Lb. of combined water expelled from the hydrated silica in the dry slurry. $W\times0.0108$ lb.	(1) Lb. of clinker produced per 1 lb. of standard coal. W lb.	(2) Equivalent weight of dry slurry per 1 lb. of standard coal. $W\times1.5603$ lb.	(3) Lb. of CO_2 evolved from the slurry. $W\times0.5238$ lb.	(4) Lb. of combined water expelled from the kaolin in the dry slurry. $W\times0.0257$ lb.	(5) Lb. of combined water expelled from the hydrated silica in the dry slurry. $W\times0.0108$ lb.
15.732	24.547	8.240	0.4043	0.1699	5.181	8.084	2.714	0.1332	0.0560
15.414	24.050	8.074	0.3961	0.1665	4.795	7.482	2.512	0.1232	0.0518
15.102	23.564	7.910	0.3881	0.1631	4.413	6.886	2.312	0.1134	0.0477
14.793	23.081	7.748	0.3802	0.1598	4.032	6.291	2.112	0.1036	0.0435
14.485	22.601	7.587	0.3723	0.1564	3.993	6.230	2.091	0.1026	0.0431
14.177	22.120	7.426	0.3643	0.1531	3.956	6.173	2.072	0.1017	0.0427
13.873	21.646	7.267	0.3565	0.1498	3.919	6.115	2.053	0.1007	0.0423
13.575	21.181	7.110	0.3489	0.1466	3.882	6.057	2.033	0.0998	0.0419
13.271	20.707	6.951	0.3411	0.1433	3.843	5.996	2.013	0.0988	0.0415
12.972	20.240	6.795	0.3334	0.1401	3.806	5.939	1.994	0.0978	0.0411
12.675	19.777	6.639	0.3257	0.1369	3.769	5.881	1.974	0.0969	0.0407
12.386	19.326	6.488	0.3183	0.1338	3.731	5.821	1.954	0.0959	0.0403
12.094	18.870	6.335	0.3108	0.1306	3.693	5.762	1.934	0.0949	0.0399
11.806	18.421	6.184	0.3034	0.1275	3.656	5.704	1.915	0.0940	0.0395
11.522	17.978	6.035	0.2961	0.1244	3.619	5.647	1.896	0.0930	0.0391
11.239	17.536	5.887	0.2888	0.1214	3.582	5.589	1.876	0.0921	0.0387
10.954	17.092	5.738	0.2815	0.1183	3.545	5.531	1.857	0.0911	0.0383
10.675	16.656	5.592	0.2743	0.1153	3.507	5.472	1.837	0.0901	0.0379
10.397	16.222	5.446	0.2672	0.1123	3.469	5.413	1.817	0.0892	0.0375
10.125	15.798	5.303	0.2602	0.1094	3.432	5.355	1.798	0.0882	0.0371
9.8498	15.368	5.159	0.2531	0.1064	3.395	5.297	1.778	0.0873	0.0367
9.580	14.948	5.018	0.2462	0.1035	3.359	5.241	1.759	0.0863	0.0363
9.311	14.528	4.877	0.2393	0.1006	3.320	5.180	1.739	0.0853	0.0359
9.045	14.113	4.738	0.2325	0.0977	3.283	5.129	1.720	0.0844	0.0355
8.785	13.707	4.602	0.2258	0.0949	2.915	4.548	1.527	0.0749	0.0315
8.680	13.543	4.547	0.2231	0.0937	2.549	3.977	1.335	0.0655	0.0275
8.408	13.119	4.404	0.2161	0.0908	2.185	3.409	1.145	0.0562	0.0236
7.984	12.457	4.182	0.2052	0.0862	1.824	2.846	0.955	0.0469	0.0197
7.570	11.811	3.965	0.1945	0.0818	1.466	2.287	0.768	0.0377	0.0158
7.165	11.180	3.753	0.1841	0.0774	1.111	1.733	0.582	0.0286	0.0120
6.761	10.549	3.541	0.1738	0.0730	0.760	1.186	0.398	0.0195	0.0082
6.359	9.922	3.331	0.1634	0.0687	0.411	0.641	0.215	0.0106	0.0044
5.963	9.304	3.123	0.1532	0.0644	0.065	0.101	0.034	0.0017	0.0007
5.568	8.688	2.917	0.1431	0.0601	0.000	0.000	0.000	0.0000	0.0000

Calculation of the Weight of Combined Water Expelled From the Kaolin in the Dry Slurry During the Production of a Given Weight of Clinker—From the data given in Part X it is shown that to every 100 lb. of clinker produced 2.57 lb. of combined water are expelled from the kaolin in the slurry. Hence the weight of water expelled from the kaolin during the formation of x lb. of clinker is formed by multiplying x by the factor 0.0257. In this way is derived column (4) of Table I herewith.

Calculation of the Weight of Combined Water Expelled From the Hydrated Silica in the Dry Slurry During the Production of a Given Weight of Clinker—In Part X it was shown that in the production of 100 lb. of clinker 1.08 lb. of combined water were expelled from the hydrated silica contained in the slurry. Hence column (5) of the annexed table is derived by multiplying the weight of clinker in pounds by the factor 0.0108. It shows the weight of water expelled from the silica during the production of x lb. of clinker.

(To be continued)

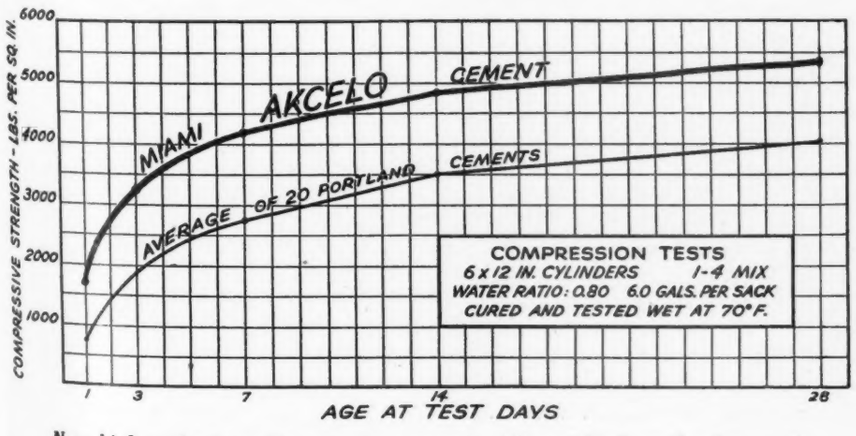
Southwestern Markets New High-Early-Strength Cement

UNDER the brand name "Akcelo" the Southwestern Portland Cement Co., Osborn, Ohio, has placed on the market a new high-early-strength cement, described as a "perfected portland cement" and guaranteed to conform to all the requirements of the A. S. T. M. specifications for high-early-strength portland cement. The fineness is said to be 98% through 200-mesh; the initial setting time 2 hr. 35 min.; the final setting time 5 hr. 30 min.; tensile strength (1:3 standard mortar briquettes) at 1 day 310 lb. per sq. in.; at 3 days, 415; 7 days, 450; 28 days, 485.

The manufacturer further describes the product: "Akcelo is not a quick-setting cement and can be handled and troweled as long as other portland cements.

"The movement of American industry today demands a cement that will prevent undue delays and permit practically continuous operation of plant and equipment while necessary repairs or changes are being made. Through the use of Miami Akcelo cement, floors, driveways, pavements and all kinds of concrete can be placed today and used tomorrow.

"Akcelo cement contains no admixtures. It is a true portland cement that has been especially produced to provide the rapid-hardening qualities that insure 24-hour concrete."



New high-early-strength cement compared with standard portland cement

A. S. T. M. Committee on Concrete and Concrete Aggregates

THE SUBCOMMITTEES of Committee C-9 on Concrete and Concrete Aggregates of the American Society for Testing Materials reported considerable progress at the meeting of that committee held in Pittsburgh in conjunction with the Group Meeting of A. S. T. M. Committees.

The Subcommittee on Strength Tests of Concrete conducted a survey of 56 testing laboratories to determine advisability of raising present temperature requirements for storage of concrete and mortar specimens. The results of the survey indicated that present requirements should be retained. It was felt that a higher temperature would result in greater variations in temperature than a proper regulation of present requirements.

Study of Core Drills

The Subcommittee on Apparatus presented a comprehensive report covering a study of the operation of pavement core drills. The report, which it is expected will be published as a part of the annual report of the committee, discusses spindle speeds, spherical and crushed shot, thickness of bit wall, design of cutting end, hard and soft steel bits, pressure on drill spindle, addition of abrasives, such as sand, in addition to shot, diamond drills, and other types of drills and abrasives.

The Subcommittee on Measurement of Materials, Mixing and Placing of Concrete presented two important reports, one covering the determination of materials in freshly mixed concrete, and the other, a method for determining the amount of materials in hardened concrete. It is expected that the latter method will be recommended to the Society for publication as tentative.

New Specific Gravity Test

The Subcommittee on Specifications and Methods of Tests of Aggregates reported on the requirements of quality and uniformity of fine aggregate and on a new method of test for determining the apparent specific gravity of coarse aggregate in the saturated condition. The committee is undertaking a study of the effect of rate of freezing on the freezing and thawing tests and a study to determine the necessity of using pure sodium hydroxide in the performance of the color test for organic impurities.

Specifications for curing of concrete were presented by the Subcommittee on Curing and proposed as tentative standards. These cover:

1. A general specification for curing, including cold weather curing.
2. Curing with wet coverings.
3. Curing with bituminous coverings.
4. Curing with surface application of calcium chloride.
5. Curing with calcium chloride admixture.

The Subcommittee on Elasticity and Volume Changes of Concrete was instrumental in having presented a paper on "The Effect of Aggregate and Other Variables on the Elastic Properties of Concrete," by P. M. Noble, which will be published as an appendix to the report of the committee.

The newly organized Subcommittee on Ready-Mixed Concrete has under way the preparation of a specification which it is hoped will form the basis of a purchase specification for ready-mixed concrete designed on the basis of (1) arbitrary proportions, (2) water-ratio method, and (3) strength.

The Technical Subcommittee proposes to conduct an intensive study of the limitations and significance of test results in determining the qualities of concrete.

British Method for Waterproofing Concrete

WATERPROOFING METHODS for cement and concrete used in England are described by H. R. Lordly. He says tarry solutions should be applied to the surface when warm. A processed artificial gypsum acting as a carrier for tannin is added to portland cement to make it waterproof. It also acts as a catalytic agent to promote hydration of the silicates and aluminates. Mixtures are given for cement laid under water, used to stop leaks from the inside, and repairing underwater damage to ships.—*Chemical Abstracts.*

Opportunities for Using Indicating and Recording Control Instruments in the Rock Products Industries

Part III — Temperature Measurement, Indicating, Recording and Control—Advantage of Instrumentation to Industry—The Automobile Industry

By James R. Withrow

Chairman, the Chemical Engineering Department, the Ohio State University

THE FIRST TWO ARTICLES of this series were published in Rock Products, December 22, 1928, and February 16, 1929. Press of other work and delay in collecting and collating a wealth of data necessary for their completeness prevented a continuation of the articles at that time.

The fact that instrumentation has been such a significant factor in the development of modern industry strongly indicates that it should be of greater help than it appears to have been in the rock products industries. A few definite illustrations of the advantages which instrumentation brings every day in these industries where great strides have resulted should help show *just what instrumentation actually does do.*

Opportunities to use instruments not only exist in industry, and instrumentation made possible great strides in industry, but the practical question is, in what way does instrumentation advantage industry? Only with some idea of the functioning of instrumentation in industry, where instruments are essential or have paid dividends, can we vision the possibilities in the rock products industries—only so can we see if we are overlooking opportunities—only so can we determine if instruments now in use in the rock products industries are being used to give us their full return.

Introduction

THE IDEA is inevitable that instrumentation should be of greater help in the rock products industries than it has been.

The early articles of this series briefly discussed and emphasized the opportunities for using instruments in the rock products industries. These articles have clearly shown by citing specific industries that instrumentation has been a significant factor in the great strides taken by modern industry.

This article will show some of the advantages modern industry derive from instrumentation. The rock products industries should also seek these advantages.—The Author.

Battery of drying ovens equipped with recording thermometers

The whole modern development of industry has been made possible largely if not entirely because of instrumentation. The leaders in the rock products industries are keenly aware of this fact. The rock products industries are not as a whole so seriously behind the time in the use of instruments as some believe. Backwardness in the use of instruments in individual plants of course exists in this as in other industries. However, the advantages of instrumentation can be made clearer in some ways by illustration of the uses of instrumentation in specific cases from industry in general. Even the backward in the use of instruments will discover in these cases food for thought. They should provoke discussion and action. The part that instrumentation has played in the development of other industries should indicate whether or not rock products industries would be helped *by more extensive* instrumentation. This is the important question.

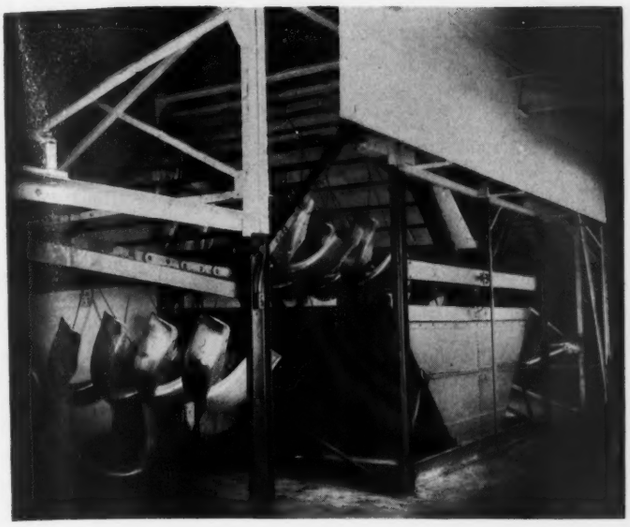
Universal Use of Instrumentation

The advantage to industry of instrumentation arises primarily from the fact that any engineering manipulation of raw material or product which involves the possibility of variation such as rate of speed, amount of work done, power applied, pressure or temperature used, or the length of time of any of these, thereby affecting the quantity of raw material consumed, or the amount of product or its quality, or producing any material variation, will be *reflected in service rendered* and *eventually in dollars and cents.*

Instruments are the super-watchdogs of such engineering variables.

As we have seen, wherever in industry any activity, quantity or quality can vary in any way, whether

by prearranged plan, or
by unarranged decision of workers or operators, or
by mere failure of a function, or



Above—Handling automobile parts in instrument controlled lacquer drying ovens

Right — Control of the lacquer drying ovens

failure of delivery of material at any spot or time in an organized effort, or by any unforeseen contingency whatever, or

by sheer accident or breakdown,

instrumentation at once becomes available as an aid—as a tool—as a remedy. Obviously the rock products industries furnish many needs of this kind.

Instrumentation and Labor

Measuring, indicating, recording and control instruments have been the most useful tools of engineering. Some operations should never be carried out without instrumentation, as this requires too great intelligence, and depends unnecessarily upon mere skill of operators. Even the most skilled operators can be unjustly blamed for bad results, and the management thus falls into trouble by failing to discover the real cause of the trouble. This availability of measuring, indicating and control devices puts in the hands of the worker a means of becoming skilled. He then can see around the corner, as with a periscope. He can think deeper. He gets more information and can therefore do a better job. The skilled worker in fact becomes greatly more skilled than any human could otherwise reasonably expect to become. Instrumentation tends to raise labor up to the level of good engineering.

Labor's trouble is not wages. Labor's greatest need has always been protection against the unconscious or the unscrupulous misrepresentation of its results when they are being discussed by higher officials. For this reason the foreman, like the sergeant in the ranks, should be the greatest friend of labor. The subordinate official is always present to state the facts when management is seeking explanations which might otherwise result in blame upon labor. Scrupulous honesty here is vital. Uncertainty in position is greatly removed when labor has complete confidence in management in this regard. Labor quickly learns that recording instruments do not favor him, but do state just exactly what resulted from his activities. No one can ask of a friend anything greater than the precise truth.

Instrumentation, therefore, is bound to have a great growth in the future, due to appreciation by labor. The rock products industries can distinctly help themselves in this connection by raising the morale of labor in this way by instrumentation.

Instrumentation and Management

This availability of instrumentation also gives management adequate information. Management can rest only on actual information. Through instrumentation management therefore becomes like the skilled worker, master of the job. Management ceases to blame where blame does not belong. Above all, however, recording devices give management a real, indisputable basis for complete confidence in the workers themselves; and the honest worker has a scientific unerring advocate on the desk of the manager in the shape of the daily chart from the recording device. Rock products managers also require this grasp of the situation.

Limitations of Instrumentation

A number of great industries can and do operate in a satisfactory manner without the aid of instrumentation, though many plants in a group have standardized to such an extent that instrumentation has become a necessity. Few manufacturing enterprises today can compete without instrumentation. The presence of instruments is a sign of good management. Few plants, where chemical changes take place, as in the calcining industries, are without them. Instruments, however, are not a substitute for common sense or intelligence in either workman or management. Their absence is not a sign of bad management; but it may be a sign that too much depends upon individuals in management.

In these discussions it is always understood that *instruments cannot think*. They merely perform. When kept in good order they do perform as designed. Instrumentation assists in the development of higher skill in workers, hence its value. When properly used and their performance properly correlated to the work, few, if any, engineers or workmen or managements would dispense with instrumental control. Instruments are not, however, a substitute for intelligence or brains in either workers or management. Instruments cannot do the thinking for a rock products plant. The management must do this or employ someone who can.

Advantages of Instrumentation to Industry

It is a reasonable conclusion that measurement and instrumentation have been responsible for the great strides in modern industry. The fact that instrumentation has been a significant factor in the great strides of modern industry indicates that instrumentation has distinct advantages in widely different industries. Let us enumerate a

few definite cases. Space does not admit of going into complete detail even of one case. A volume could be written about instrumentation in any industry dependent upon it. This is even true of the great bulk of industries using but not completely dependent upon instrumentation. Definite illustrations, however, from here and there in industry should make clear how instrumentation is frequently applied in industry and the advantages which accrue, indicating where the rock products industries may find such experience already accumulated and paid for which might be set to work in these industries.

The achievements of instrumentation in industry constitute the best demonstration of its advantage to industry. A few cases will illustrate the advantages in particular industries where the industry could not exist without instrumentation.

Advantages of Instrumentation in the Automotive Industry

The automobile industry never could have developed without instrumentation. Probably no instruments whatever except an occasional thermometer in a varnish kettle were actually used in the manufacture of early automobiles. If instrumentation had not developed to meet the demands of commerce the automobile today would be just what it was at first: expensive in first cost and operation, uncertain in performance, short in life, grotesque in appearance as the rural buggy and the hoop skirt, or as heavy as a truck or freight car and an unimportant factor in transportation. There would be no such thing as aviation. The dash-board panel of instruments on the average car shows how dependent we are on instrumentation in mere car driving. Yet the real work in automobile instrumentation is elsewhere.

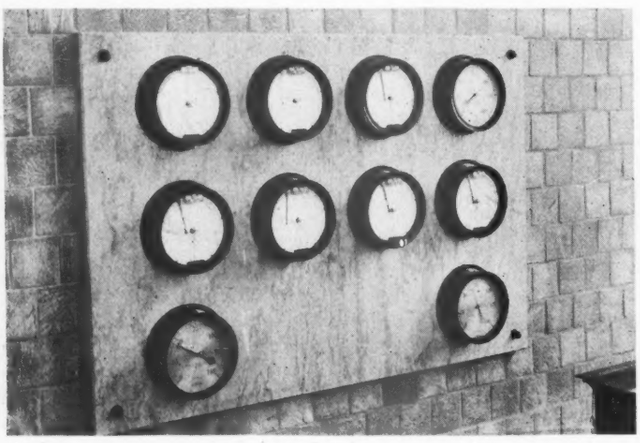
Lacquer Finishes—If we were not informed, for instance, how little we would think of the effort which has gone into the control and manufacture of the automobile finish. Yet the demand of the last 10 years was so great it would have been next to impossible to produce by old rule-of-thumb varnish manufacture the immense amount of varnish and lacquers required in automobile finishes. Even with the best control, the producers are far from satisfied with their ability to reproduce colors and shades required or secure the permanence which they desire. All varnish and lacquer kettles for years have been equipped with temperature measuring devices, and much of the advance in this industry has been connected with this humble fact.

The introduction of temperature and drying control instruments has enabled new methods to be introduced which have wrought a revolution in this industry. For instance, it used to require from 30 to 90 days to finish a body. Now the whole job is completed in a matter of hours, entirely due to the technical skill and control in the varnish and lacquer industry which, if not discovered, was at least most extensively developed by the automobile industry.

The saving in time alone has resulted in the saving of many hundreds of thousands of dollars. For instance, the average automobile body plant will have a thousand bodies in process. Under the old system these required four weeks for cheap cars and six weeks for expensive cars in the finishing operation. Today but 24 hours to a few days are required for the whole process due to these modern engineering developments. The saving per car easily averages $50, or a saving in the average body plant handling a thousand bodies per day, in the neighborhood of $500,000 a year, not to speak of the fact that the production turnover has been increased theoretically in the neighborhood of 2500%, and the floor space required has been enormously curtailed so that the savings from this one item has run into enormous figures. This saving crops out in a place where one would never expect such figures to be possible, namely, finishing.

It is not saying too much to state that these chemical engineering developments which have resulted in tremendous savings would be practically impossible were it not for apparently merely incidental temperature control and regulation in the manufacture of lacquers and in the handling of the sprayed bodies. These savings in unexpected places by instrumentation show that no industry, even the rock products industries, should overlook the use of instrumentation where at all feasible.

(*To be continued*)



Gage board assembly, with seven recording thermometers and three pressure gages

Rock Products Exhibitors of the Thirteenth Exposition of Chemical Industries

A NUMBER OF PRODUCERS in the rock products industry exhibited their products at the 13th Exposition of the Chemical Industries, held in Grand Central Palace, New York, N. Y., May 4-9, 1931.

Exhibitors included Alberene Stone Co., New York City, N. Y.; the American Lime and Stone Co., Bellefonte, Penn., who showed high-calcium and high-magnesium lime and limestone in all forms suitable for use in the chemical industry in the manufacture of various products. "Belle Mine" pebble lime, a quick slaking, high-calcium lime with a high suspension value in water, was featured. The Warner Co., Philadelphia, Penn., was associated with the American company in this exhibit. The Barnsdall Tripoli Co., St. Louis, Mo., exhibited several grades and classes of crude tripoli, various grades of ground tripoli, and some of the principal products in which tripoli is an important ingredient. This included tripoli held in suspension in polishing liquids, and various types of buffing and polishing compositions and pastes. The Celite Products Co., Los Angeles, Calif., the Chicago Mica Co., Valparaiso, Ind., the Hunkins-Willis Lime and Cement Co., St. Louis, Mo., the Peerless White Lime Co., Ste. Genevieve, Mo., and the Southern Mineral Products Corp., Burlington, Vt., each was represented with an exhibit of its products.

The exhibit of the Philadelphia Quartz Co., Philadelphia, Penn., was of particular interest because it was in observance of the company's 100th anniversary. Its numerous brands of silicate of soda and its newest product, "Metso," a sodium metasilicate, were on exhibit. "Doucil," a base-exchanging gel for softening water, was also displayed. Industrial articles cleaned by the new alkali, Metso, were shown.

A. S. T. M. Committee on Lime

COMMITTEE C-7 on Lime of the American Society for Testing Materials at its meeting held in conjunction with the Group Meeting of A. S. T. M. Committees at Pittsburgh gave consideration to revisions of the Specifications for Hydrated Lime for Structural Purposes, particularly in respect to the plasticity test. The committee also considered modifications of the present Specifications for Sand for Lime Plaster.

The committee has in mind undertaking research work on various phases of lime, one of the first to be undertaken covering the effect of rate of burning on the properties of lime.

Of special importance is work now being undertaken in respect to finishing lime, looking toward the development of specifications for this product.

Consideration is also being given to the behavior of lime plaster in fire test.

Quarry of New Haven Trap Rock Co., New Haven, Conn., before the blast of March 27

Blasting Practice at the Quarry of New Haven Trap Rock Co.

By S. R. Russell
E. I. du Pont de Nemours and Co., Wilmington, Del.

THE New Haven Trap Rock Co., New Haven, Conn., owns and operates one of the largest trap rock quarries in the country at North Branford, Conn. The plant produces annually from 750,000 to 1,000,000 tons. The stone is shipped both by rail and water to points in New England and in New York State. William E. Hilliard is general manager and Alex. McKernan, superintendent. Mr. McKernan has been superintendent of the plant since it started about 1913.

The face of the quarry is about a mile long and for years this face was quarried in two benches, each about 45 ft. high. A combination of well drilling and snake-hole drilling was used. The well-drill holes were spaced about 25 ft. apart and 35 ft. back. Along the bottom snake holes 30 ft. deep, spaced 6 ft. apart, were drilled and sprung. Usually the well drill holes and snake holes were shot together. The tunnel method of blasting was so successful in other trap-rock quarries in the vicinity that Mr. McKernan decided to try it out at North Branford.

It would not be economical to use this method in a face of only 45 ft. Consequently the two faces were combined, especially on the north end of the quarry. The first tunnel blast was made in the spring of 1930 and results and costs were so encouraging as to warrant continuing this method.

Consequently in the spring of 1931 five tunnels were prepared for blasting. These were fired in two blasts. The first shot consisted of two tunnels. The distance from end to end of wings was over 300 ft., average horizontal burden, 60 ft., and average height of face, 100 ft. The load consisted of 44,000 lb. of "Red Cross Extra" 40% dynamite, and this shot produced more than 200,000 tons of stone.

Tunnel Method Used

The second blast this year consisted of three tunnels as shown in the sketch and was made on March 27, 1931. The total length from end to end of outside wings was 590 ft. The tunnels were loaded with 60,200 lb. of Red Cross Extra 40% dynamite. In addition, there were eighty-nine 30-ft. snake holes drilled along the bottom where the burden was extremely heavy. In these snake holes 5,200 lb. of "Gelex A" were used.

No back filling was used at all between the various charge units. However, the stem of each tunnel was back-filled from the charge units to right and left of the intersection to a point about two-thirds the length of the stem. Material removed from tunnels during driving and one-man stone were used for back filling. All the dynamite used in the tunnels—1204 cases—was placed in eight hours, on March 25. Stemming or back filling the three adits was completed the following day in eight hours.

Connections were made in straight parallel. Two No. 14 gage duplex wires hung through eye pins in the roof were strung from the portal of each tunnel, one to end

The quarry face starts to break down

The resulting 300,000 cu. yds. of stone on the quarry floor

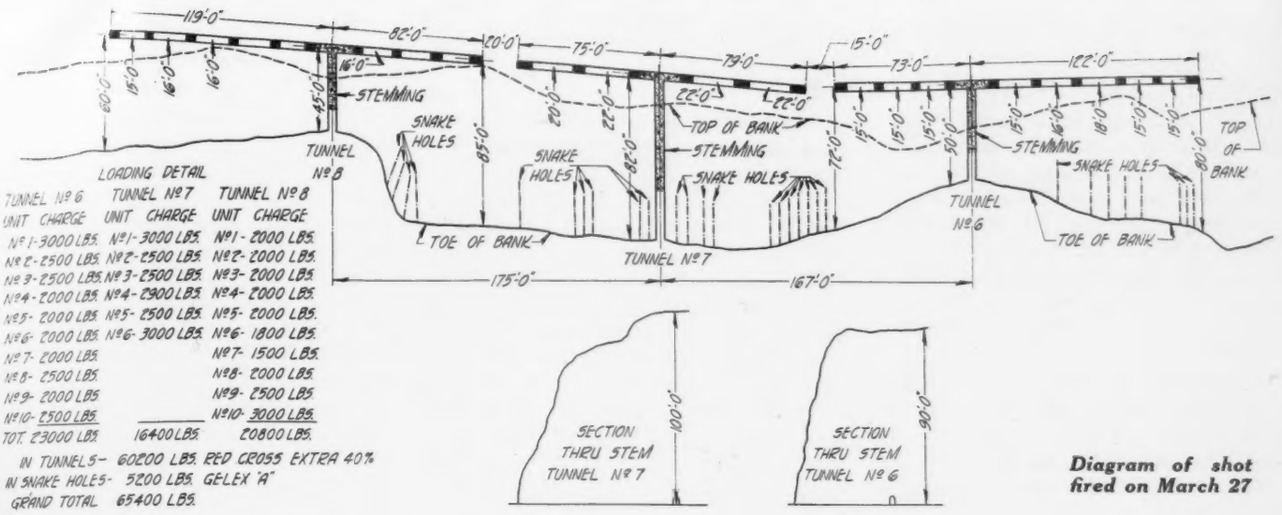


Diagram of shot fired on March 27

of right wing and one to the end of left wing.

Two No. 8 electric blasting caps were primed in each unit charge, the wire being tapped at the point of the charge. A line of cordeau was also strung from end to end of wings and out to the portal of each tunnel.

The blast was fired with a 440-volt 60-cycle, a.-c. line.

This blast produced upwards of 300,000 tons of nicely broken stone. With previous tunnel and some well drill holes shot later, the New Haven Trap Rock Co. began the season with over 600,000 tons of stone on the quarry floor.

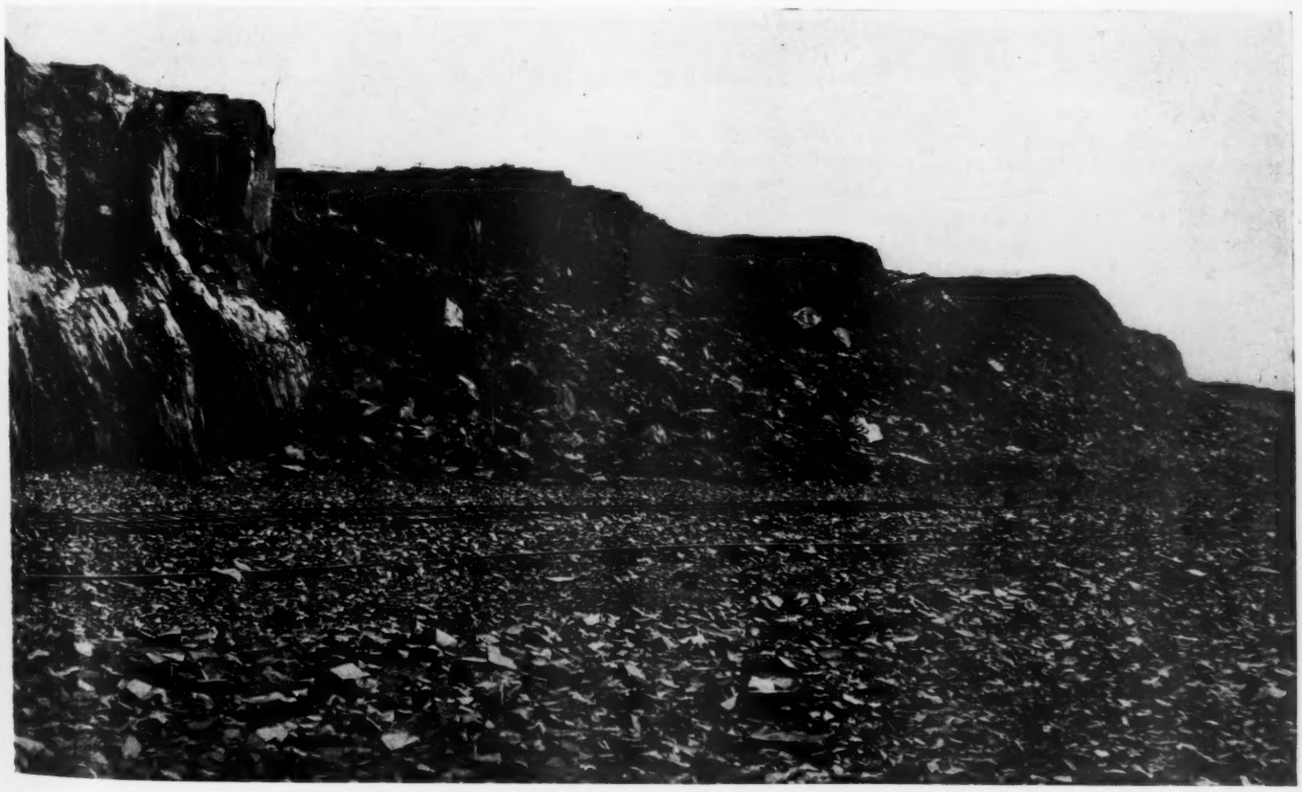
It is interesting to note that directly under the quarry at North Branford there is a water tunnel, about 8 ft. in diameter, which carries the water to the city of New Haven. This tunnel is 90 ft. below the level of the quarry floor, and in this instance was almost directly below the place where the blast occurred.

Water Tunnel Under Quarry Not Damaged

Close inspection was made of this tunnel after the blast and tests made during the blast. Yet no damage whatever was done and the total charge in the second blast was 66,200 lb. of dynamite.

Influence of Sand Additions to Portland Cement

TESTS ON THE INFLUENCE of sand additions on the mechanical properties of portland cement have been described by A. V. Filosofov. These tests were made to obtain a "sand cement" containing 0-30% sand, portland cement clinker and gypsum (2% of the weight of the clinker). The chemical composition of these materials is given and tests are described. The results are tabulated and show that additions of up to 20% of sand to portland cement do not lower its resistance to pressure and that additions of sand do not influence the setting time of cement.—*Chemical Abstracts.*



Final result of blast was about 300,000 tons of loose rock

Premature and Hangfire Explosions

WHILE NEARLY EVERY misfire and hangfire can be prevented, there has not yet been set up in ordinary blasting practice any generally applicable set of factors eliminating the possibility of serious or fatal injury to the men whose jobs it is to correct them after they occur, says F. F. McLaughlin, general superintendent, Rock-Cut, N. Y., plants, General Crushed Stone Co., in an article in the April issue of *Explosives Engineer*.

A misfire is the failure of any part of a charge of explosives stemmed to detonate when fired. A hangfire occurs when the loaded charge seems to go, at least in part, yet incomplete detonation is reasonably indicated.

The causes of these failures, and precautions that help to eliminate them, are (1) improper supervision of the work; an essential characteristic of a good supervisor is one who thinks before he acts; (2) condition and length of time of storage of explosives and detonators at the place of use; the type of construction used for the magazine will provide dryness and moderate temperature in most places, necessary for proper storage. When electric blasting caps are used, a few of each box should be tested with a galvanometer when received, just before use in a bore hole, and just prior to their being connected for a blast; (3) carelessness in handling explosives at time of loading holes, and in the loading; proper handling will be most certain if the boxes are opened at the loading operation, and (4) failure to properly connect detonators for firing; in loading, part of the detonating agent should be in contact with the lowest portion of the explosive column, and this practice repeated for each section of a broken charge that may be used. A standard practice for connections should be established based on number of holes per row, number of rows, voltage, amperage and cycle of electric power used for firing.

Records and personal observation of the blast will usually indicate the occurrence and location of a misfire. The unexploded charges must then be exploded to remove the danger. A record showing the location of charges and detonators in each bore hole is important. With such records investigation and corrective measures may be undertaken more safely.

The first step in treating a misfired hole is to determine whether the detonator is in proper condition. Reconnecting the hole and firing it is usually a simple matter then. When the detonator has been destroyed explosives should be fired by percussion if possible. This can be done if the stemming can be uncovered to expose the explosive, a new charge set on the column, stemmed and denonated in the usual manner. Two methods may be used to recover the stemming; neither of them is safe. Air may be used under sufficient pressure to blow the stemming from the hole. This prodding with air is hazardous unless records are sufficiently accurate to insure stopping within 6 in. of the top of the explosive. Another method is to use a copper spoon to recover the stemming. This is the safer method. The addition of water is advantageous if the explosive is not rendered insensitive by water.

Where the explosive column has been separated into "decks" the best method is to drill an adjacent hole within 2 or 3 ft. of the misfired one, so that a new charge of explosives opposite the old may be detonated in an attempt to fire them through shock or percussion. In conclusion Mr. McLaughlin repeats that the best treatment for misfired and hangfired holes is to prevent them from occurring.

Quarrying Vanport Limestone

ENORMOUS QUANTITIES of Vanport limestone are obtained from counties in western Pennsylvania for use as flux in the steel mills, road building and the manufacture of portland cement.

This limestone deposit does not exceed 22 ft. in thickness, says C. H. Coale in a recent article in the *Du Pont Magazine*. Since it lies in ledges of quite different character, it is generally advisable to quarry it in two, or sometimes three, benches. A buffer is usually carried; that is, instead of cleaning up the material broken by each blast, the whole or part of it is left in place until the next blast has been fired. This buffer increases fragmentation and also acts as a protection for the track. It is not practical, however, where the face is over 50 or 60 ft. high.

High-speed, self-rotating hammer drills are more generally used in this area. Bore holes start at 1¾ to 2 in. in diameter and finish about 1⅝ in., so they will accommodate 1½ in. cartridges of dynamite.

Two methods of primary blasting are used: First firing single or multiple rows of holes by means of electric blasting caps; and, second, single-hole blasting by means of blasting caps and fuse. The simultaneous firing of a whole row, or a number of rows of holes, is the more common practice.

Several kinds of explosives are successfully used in buffer blasting. Forty per cent. quarry gelatine is used where water resistance is needed. Low-density ammonia dynamites are used where water is not encountered. Semi-gelatine dynamites have also been used with success in this work. Being more bulky, they afford substantial savings where they can be used. Mr. Coale says that drilling costs with high-speed hammer drills are about 6 to 7 c. per ft. of bore hole and a breakage of 2½ to 3½ tons of limestone per pound of explosive is obtained by this method of operation in the Vanport limestone.

Southern California Stucco (Gypsum) Manufacturers Form Association

MANUFACTURERS of stucco and of acoustic plaster in Southern California, realizing the benefits to be derived from co-operative efforts, have banded together in the Stucco and Acoustic Plaster Institute. Formal announcement was made of the organization in February and since that time the work has been progressing satisfactorily, according to Manager Carl W. Spaulding.

The purposes of the Stucco and Acoustic Plaster Institute are formally announced as effecting economies of co-operation between architects, contractors, owners and manufacturers; standardization of present methods and equipment; research for new and better methods and materials; promotion of the mutual interests of all; creation of a better understanding of the uses of stucco and acoustic plaster; and the ethical merchandising of products through proper channels.

Manufacturers of stucco and of acoustic plaster comprising the Institute membership are as follows: American Stucco Co., Angelus Stucco Co., Blue Diamond Corp., Ltd., California Stucco Products Co., Calacoustic Corp., Eclipse Plaster Products Co., Geo. A. Bowman, Inc., Golden West Stucco Co., Harbor Stucco Co., La Habra Stucco Co., Mission Lime Products Co., National Acoustic Plaster Co., Ltd., Nephi Plaster and Mfg. Co., Pacific Stucco Co.

In commenting on the Institute, Manager Carl Spaulding says:

"The Institute was organized by those who are willing to spend time and money to improve conditions in their branch of the plastering industry. All previous efforts along the lines of co-operation with other groups in the industry, research, promotion and ethical merchandising have been intermittent and individual—now the same efforts, through the Institute have become concerted. As a first step, we have been setting our own house in order; standardizing on methods of sales and advertising and the elimination of duplicate or waste motion. The economies so effected have enabled us to improve the quality of our various products and to increase the total output by means of ethical service and promotion.

"Today we are committed to a higher standard of raw materials than formerly. Also, the Institute is committed to a minimum specification formula that is higher in quality and cost and is our answer to the demand for quality products at a reasonably low cost.

"By virtue of being united in the Institute, the manufacturers of stucco and acoustic plaster feel that they will be enabled to co-operate more effectively with individuals and organizations."

Cement Company Wins Dust Case

THE BRITISH COLUMBIA CEMENT CO., Ltd., Victoria, B. C., Canada, operating the plant at Bamberton on the Saanich Arm, has by the final judgment of Mr. Justice Gregory of the supreme court just handed down, won a complete victory in the cement dust nuisance case brought against the company by the Malahat Park, Ltd., and the Sandy Beach Inn and Golf Links, Ltd., owners of property running from the beach over the Malahat drive up the mountain on which they claimed they planned to build a big resort hotel with golf links and fishing pools.

The case was tried here early in the year before the judge and a jury. After a trial lasting over a week the jury brought in a verdict giving no damages to the resort companies.

The official judgment of the justice now handed down completes the unqualified victory of the cement company and the resort companies will have to pay all the costs.—*Victoria* (B. C., Canada) *Times.*

Bell Cement Project May Go to Los Angeles Voters

WHETHER Alphonzo Bell shall establish a cement mill and rock crushing plant in the residential section of the Santa Monica mountains, Calif., may be determined by the people at the June 2 election.

This was indicated unofficially by the city attorney's office, following a decision of the supreme court May 2 in which City Clerk Robert Dominguez was ordered to re-examine the referendary petition signatures and declare thousands of signatures valid which he had heretofore discarded for technical reasons.

This decision was hailed as an outstanding victory by those who have been battling for nearly three years to prevent Alphonzo Bell from building a cement mill and doing a rock crushing business in that area. They contended that such a move would do irreparable harm to property values.—*Los Angeles* (Calif.) *Examiner.*

Report New Cement Project for Mississippi

ANNOUNCEMENT was made recently by Mayor W. S. F. Tatum, of Hattiesburg, Miss., of virtual completion of arrangements for the entry of a million-dollar cement industry into Hattiesburg.

The announcement follows one day after the formal statement, confirming completion of arrangements for bringing natural gas to Hattiesburg.

Construction of the new plant is expected to require about nine months. It will cover about 15 acres, the mayor said.—*New Orleans* (La.) *Times-Picayune.*

Cement Manufacturers Told This Is Record Road-Building Year

THE COUNTRY'S greatest rural pavement building year is now under way, according to Wm. M. Kinney, vice-president and general manager of the Portland Cement Association who reported on business conditions and outlook at the annual spring meeting of the association at New York City, May 11-12.

More Roads to Be Built

Awards for concrete rural roads for the first four months of this year exceed by more than 55% those for the same period of last year, Mr. Kinney stated. He believes that the record of 10,250 miles of concrete pavement awarded to contract last year will be eclipsed easily in 1931. Contracts placed up to May 1 call for the construction of 57 million square yards, the equivalent of about 5,400 miles of 18-ft. pavement.

Placing Contracts Early

Most road-building agencies have made a special effort to place contracts early this year in order that workmen may get on the jobs without undue loss of time, Mr. Kinney pointed out.

"There are few industries that exceed the road industry in its dependence on labor," asserted Mr. Kinney. "Although labor-saving machinery has been introduced into road building as in other industries, money spent for roads still largely goes into the pockets of workmen.

"Studies made in Iowa show that approximately 52% of the cost of pavement building goes directly into the pockets of workmen, while another large portion is received by workmen who build the needed equipment. An indication of how highway money is distributed is given in the report of the Conference of Pennsylvania Construction Industries which states that roughly 80% of the money spent for road improvement in Pennsylvania, all things considered, was paid to workmen.

Many Men to Have Work

"Shortly, hundreds of thousands of men throughout the country will be closing gaps in pavements for continuous low cost travel, widening highways for the relief of metropolitan motorists, placing single lane pavements for the accommodation of residents along less frequented roads, and building elevated highway intersections and railroad grade separations for greater motor safety. But even though 1931 will see new road building records, there is still much to do. At present the mileage of rural pavements that bring low cost motoring and low road upkeep costs is less than half of the mileage of trunk line railroads," concluded Mr. Kinney.

Michigan House Approves Cement Plant Sale

PART OF the death sentence for the state cement plant at Chelsea, Mich., operated as an industry of the state prison at Jackson, was pronounced by the house of representatives May 6. Whether the final words will be said in the senate remains a question.

After nearly an hour's debate over the Look bill which, if finally approved, will mean the end of the plant, the house approved it by a vote of 53 to 36.

The bill, introduced by Rep. Dexter H. Look of Lowell, provides that as soon as the plant fails to show a profit for the state it shall be closed down, but in any event, it is not to be operated after June 30, 1934. The state administrative board is given the authority to dispose of the plant any time a satisfactory bid is received.

The attack against the bill was made by Rep. Harry E. Barnard of Jackson, Richard A. MacRae of Detroit, Rep. Floyd G. Town of Liberty and Rep. William B. Campbell, all of whom charged the measure was inspired by the cement interests of the state. They predicted as soon as the industry ceased to operate, the price would increase.

Rep. Look and Rep. Ate Dykstra of Grand Rapids argued for approval of the bill.—*Saginaw* (Mich.) *News.*

Projected Government Cement Mill in Australia

IT HAS BEEN REPORTED that the new South Wales government is considering the establishment of a state cement plant on crown lands in the Carlos Gap district, where there are rich deposits of limestone. Outside sources consider that the state government is not in a position to undertake a plan of this nature because it has a contract with a private cement plant to supply about 1,160,000 bbl. of cement over a period up to October, 1933. In addition, there are five cement companies in the state at present, and none of them is operating on a large scale, in fact, it has been necessary for them to close occasionally in order to reduce stocks. There appears to be so much opposition to the state plan that the government may not take any further steps at present, although certain areas may be reserved for future development. (Assistant Trade Commissioner H. P. Van Blarcom.)

Lehigh Cement Earnings

THE Lehigh Portland Cement Co. reports for 12 months ended March 31, 1931, net income of $2,140,304 after depreciation, federal taxes, etc., equivalent after 7% preferred dividends to $1.56 a share (par $50) on 450,348 shares of common stock. In preceding year company reported for 12 months ended February 28 and showed net income of $2,441,042, or $2.13 a common share.

Pittsburgh, Penn., Selected for 1932 Convention of Sand and Gravel Industry

Progress Report of Engineering and Research Division

THE DIRECTORS of the National Sand and Gravel Association meeting at West Baden, Ind., May 13 and 14, selected the William Penn Hotel, Pittsburgh, Penn., January 27-28-29, for the next annual convention of the industry. In the absence of President Robert J. Potts, due to illness, and Vice-President Harold V. Owens from business necessity, John Prince, past-president, was chosen chairman of the meeting.

In addition to the routine business of the board such as receiving the reports of Secretary V. P. Ahearn, and other officers on the activities and finances of the association, there was a round-table discussion of business conditions in the territories represented by the several directors.

Incidentally the financial reports of the association show that it is in excellent condition and that increases in membership more than make good all losses in membership and, very likely, will make good the loss in income due to shrinkage in tonnage.

Business conditions in various parts of the country reported were, with two exceptions, certainly not very encouraging, and the outlook for the present year none too good, both with respect to volume of production and prices. However, only about one-third of the producers represented at the board meeting had as yet found it necessary to cut wages or salaries, although all had cut their labor costs very materially through shorter hours and a reduced number of employes.

Progress on Research

The most important other business of the meeting was the receipt of the report of Stanton Walker, engineer in charge of the association's division of engineering and research, the high points of which are quoted as follows:

"This progress report supplements the Fifth Annual Report presented before the Fifteenth Annual Convention of the Association, held in January of this year. The various subjects covered in that report are commented upon briefly in the light of later developments. The discussion of them will be given in greater detail in the oral presentation.

St. Louis District Office

"The accomplishments of the St. Louis District Office were described in considerable detail before the last convention. It is now necessary to announce the closing, temporarily at least, of that office. Effective April 1, Mr. McGuire resigned to accept a position as assistant to the president of the Standard Building Materials Co. The office was maintained until May 1, however, for the purpose of closing up the work properly. While the St. Louis District Office was short-lived, it resulted in many lasting benefits. Undoubtedly Mr. McGuire, in his new position, will continue much of the work which was under way by the district office.

"It may be said emphatically that the closing of the office did not come from any dissatisfaction with its work or as the result of the so-called business depression. Mr. McGuire passes on to a new position which seems to offer better opportunities for him and it does not seem desirable to endeavor to replace him at this time.

"That the example set by the district office has received a favorable reception is shown by the fact that at least one other group of producers is giving consideration to the maintenance of a field service during the construction season through co-operation with this office.

Research Laboratory

"The activities of the research laboratory were covered in detail in the last annual report. It was stated that the principal efforts for the year would be restricted to the following investigations:

"1. Effect of coarse aggregate characteristics other than grading on the strength of concrete.

"2. Methods of tests for durability of aggregates and concrete.

"3. Correlation of tests of sands with concrete-making properties.

"4. Studies of size and grading of aggregates with particular reference to methods for proportioning fine and coarse sizes for concrete.

"5. Investigations for member companies.

"During 1930 considerable work was done on the first of the items listed above. Further tests are being made this year. At the present time, concrete cylinders and beams are being manufactured for a section of the investigation using 4 gravels and 2 crushed stones.

"In the study of methods of tests for durability of aggregates and concrete, our work, thus far, has been restricted to an investigation of methods of carrying out the sodium sulphate soundness tests on aggregates, with particular attention to the method for fine aggregate. It has been shown that a correct technique is highly important if accurate results are to be obtained and that an important source of error lies in methods used for measuring the results of the test. The most important phase of our activities along these lines is represented by our co-operation with various technical committees in an endeavor to develop a standard procedure for carrying out the test.

"New equipment has been purchased which permits of the study of the sodium sulphate test method in a comprehensive way. This includes a large baking oven, with automatic temperature control, for drying the samples, and a constant-temperature cabinet in which to store the samples while immersed in the sodium sulphate solution. The storage cabinet was designed and built in our laboratory. Among its essential features are: an ice compartment for lowering the temperature of the cabinet below room temperature when that is required; heating elements, regulated by a thermostat, for raising the temperature; and a fan to insure circulation of air and a uniform temperature throughout the cabinet. When the room temperature is higher than that desired in the cabinet, the cooling and heating devices are operated in conjunction with each other.

"No further work has been done as yet this year on items 3 and 4 in the above list—'correlation of tests of sands with their concrete-making properties' and 'studies of size and grading of aggregates with particular reference to methods for proportioning fine and coarse sizes for concrete.' These subjects represent most important problems and it is hoped that work can be started on them during the current year. Our small staff and the number of special problems which arise make it difficult to predict when this work can be gotten under way.

"Several special investigations have been carried out at the request of member companies. Many of these involve only the carrying out of simple routine tests. By far the largest number have had to do with sodium sulphate tests on sands from members who furnish material for highway construction in New York State and who, consequently, are affected by the new specification requirements involving that test. A few of the special investigations have involved the manufacture and testing of fairly large numbers of concrete and mortar specimens.

"It would be easy to write a voluminous report on proposed researches. There are

so many problems crying for solution that there seems to be no likelihood of finding ourselves with over-capacity laboratory facilities in the near future. Many of these problems were discussed briefly in the last annual report and it is not necessary to discuss them in further detail here. With our present staff and equipment considerable patience must be exercised in awaiting the completion of research projects. It should be stated that the 'bottle-neck' of the laboratory lies in the staff. While additional equipment is needed, no large expenditure is required for it. The present equipment would permit of the useful employment of three or four additional laboratory assistants.

Co-operation With Groups of Allied Producers

"In past reports comments have been made concerning co-operation in the work of the several organizations dealing with specifications for aggregates and the materials in which they are used. Special mention should be made of a recently formed committee consisting of representatives of the National Crushed Stone Association, the National Slag Association and the National Sand and Gravel Association. That committee, known as the Joint Technical Committee of Mineral Aggregates Associations, restricts its activities to the consideration of technical problems of common interest; the accepted definition of a 'common problem' is one which is unanimously recognized as such by the members of the committee. The Joint Technical Committee has functioned for something more than six months, and during its short life has accomplished much which it is believed will be of value to the aggregate industry. It has amply demonstrated its value as a medium for presenting a united front on questions of mutual interest.

"Several examples of its co-operation are already available. As a result of a request for comments on specifications for grading proposed by the Federal Specifications Board, addressed separately to the three associations, the Joint Technical Committee made recommendations for grading specifications for coarse aggregate to be incorporated in the specifications of the Board. These recommendations were accepted and since that time they have been tentatively accepted by committees of the American Concrete Institute and of the American Society for Testing Materials. The importance of a uniform basis for specifications in various national organizations cannot be over-estimated. Another example of the co-operation of the three associations through the activities of the Joint Technical Committee may be found in the report of our Committee on Standard Specifications, which was circulated to the membership of the Association under date of April 28. It has been agreed to present uniform recommendations for certain standard sizes of aggregates and the sizes already adopted by our Committee on Standard Specifications have been accepted tentatively for presentation to members of the stone and slag industries. It will be necessary for the crushed stone and slag industries to adopt certain additional sizes for special work. They are discussed subsequently in this report.

"In order that an idea may be gained of the bearing of the work of the various committees on the aggregate industry, there is listed below a number of typical problems which are being considered by committees of national organizations, such as the Committee on Ballast of the American Railway Engineering Association and the Committee on Concrete and Concrete Aggregates of the American Society for Testing Materials:

"1. Specifications for prepared gravel ballast including best method of testing for hardness, abrasion and resistance to weathering.

"2. Comparative costs of maintaining track on various kinds of ballast.

"3. Sizes of aggregates.

"4. Determination of per cent. of soft fragments.

"5. Cleanness of mineral aggregates.

"6. Abrasion of coarse and fine aggregates.

"7. Crushing strength of aggregates.

"8. Specific gravity of fine and coarse aggregates.

"9. Sampling mineral aggregates.

"10. Water-bound and traffic-bound roads.

"11. Bituminous surfaces and bases.

"12. Definitions for crushed stone, gravel, and crushed gravel.

"13. Effect of surface texture of aggregate on transverse strength of concrete.

"14. Soundness and durability of aggregates.

"15. Effect of stone dust on cross-bending strength.

"16. Suitability of stone sand, slag sand, and crushed-gravel sand for use as fine aggregate.

"17. Method of mortar test for sand for use as fine aggregate.

"18. Light weight aggregates.

"19. Limits on coal and lignite in aggregates.

"20. Effect of shale, clay, silt, mica, organic matter, and flat particles in aggregates.

"The above problems, taken from the agendas of three important committees, represent only a few of the very large number of almost equal interest to the sand and gravel industry. No further comment seems necessary on the importance of our active co-operation in the work of these organizations.

Publications

"It is firmly believed that our publications represent an extremely valuable method of promoting the welfare of the Association. The effects from them are not easy to measure but it is evident that they represent a most effective way of establishing the Association as an authoritative source of information and of calling attention to its activities. It is not too much to say that the publications establish the background for practically all other activities of the Association. In considering any increase in Association activities careful consideration should be given to expanding facilities for developing and distributing information—research and publications.

"None of our publications have been of the promotional, advertising type. All have been based on sound technical fundamentals and it is believed that this policy is essential to their success. While we do not wish to underestimate the value of popular advertising, it is believed that, taking all factors into consideration, it does not lend itself to the problems of the National Sand and Gravel Association as well as the distribution of literature furnishing technical information.

"Since the first of the year, no new publications, other than articles in the *Bulletin*, have been issued. The demands for our present publications have been so great that most of them have had to be reprinted; the present reprinting is the fourth or fifth for several of them. A number of projected publications are on our list and they will be prepared as soon as opportunity permits. A new bulletin will be issued shortly giving a review of tests on effect of size and grading of coarse aggregate on the strength of concrete; this bulletin will consist of the paper on this subject which was presented by the writer before the last annual convention of the Association. Other publications will describe the results of our researches as they become available and as opportunity is had to study them in sufficient detail to permit of publication. A considerable number of subjects are listed for further loose-leaf data sheets.

Correspondence

"It seems desirable in each report to make some mention of correspondence. It is steadily increasing in volume and often seems to submerge our other work. It should not be discouraged, however, since it represents a most valuable contact with the industry as a whole. It has the one disadvantage of representing work which is not apparent to the membership as a whole. Some attempts are made to indicate its general nature in the bi-weekly letter to member companies. It should be realized, however, that only a small percentage is of a sufficiently general nature to permit of listing in that letter. It is an unusual day on which two or three times as many letters are not handled as are mentioned for the two-weeks period.

Field Work

"About the usual amount of traveling has been done during the current year. Much

of it has had to do with conventions and committee activities which seem to be concentrated at this period. Some field work has been done in connection with the application of the new specifications for soundness of aggregates in New York. Any well outlined program of field activities is difficult to carry out on account of the pressure of other work. It is too early in the year to comment much on this phase of our activities. It is believed that they can be made most effective by directing them to specific problems. As valuable as it undoubtedly would be to make contacts with each member company, with several non-member companies, and with a large number of the consuming interests each year, it is believed that much of this value would be counteracted by the let-up in our other activities. It should be pointed out that our committee activities make for more contacts with consuming interests than would be possible by any other means.

Commercial Sizes

"Our work on the standard sizes has seemed to progress with unnecessary deliberation. However, this procedure is not without some advantages and more progress has been made than is apparent on the surface. The adoption of standard sizes cannot be done over night. It must come from a slow process of education and evolution; and most of the education must be to the consumer rather than the producer.

"The standard sizes recommended by our Committee on Standard Specifications have been given the necessary consideration by the members of the Association and are ready for presentation to the Division of Simplified Practice of the U. S. Department of Commerce for circulation to the entire producing and consuming interests. These sizes, with which you are all familiar, are given in Table 1. It should be pointed out again that the committee has consistently emphasized the fact that it is not expected that each producer will manufacture all of the sizes listed. It is proposed only that he will adapt his stock sizes to those recommended which most nearly fit his requirements.

TABLE 1—PROPOSED STANDARD, COMMERCIAL SIZES OF GRAVEL

Material with not more than 5% coarser than the maximum size or 10% finer than the minimum size shall be considered as conforming to these requirements. In case of a dispute, sieves with square openings shall govern.

Standard designation square sieves	Approximate equivalent round screens
No. 4— ½ in.	¼— ⅝ in.
No. 4— ¾ in.	¼— ⅞ in.
No. 4—1 in.	¼—1¼ in.
No. 4—1½ in.	¼—1¾ in.
No. 4—2 in.	¼—2⅜ in.
No. 4—2½ in.	¼—3 in.

"Table 2 summarizes the results of the letter-ballot to the membership on this question. These seem to be sufficiently conclusive to justify going ahead with the program. After a consideration of the results of our canvass, a representative of the Division of Simplified Practice has stated that, in view of the negligible amount of negative votes, the Division would be willing to undertake the canvass of the industry as a whole.

"The Division of Simplified Practice pointed out to us that a similar simplification program was being undertaken by the crushed stone and slag industries and it would greatly facilitate their work if they could present the proposed commercial sizes to the producers and users of all three industries at the same time. Accordingly, conferences were arranged with representatives of the National Crushed Stone Association and National Slag Association through the procedure afforded by the Joint Technical Committee mentioned previously. In the discussion it developed that the sizes already tentatively adopted by the other industries differed from those recommended by our committee. A study of the sizes, however, indicated that there were no insurmountable difficulties in making them agree within the range covered by our recommendations, but that certain additional sizes would be required for common uses of stone and slag. Our sizes were tentatively accepted by representatives of the National Crushed Stone Association and the National Slag Association for the range to which they apply.

"As a result of these conferences, our Committee on Standard Specifications has made the following recommendations which have been approved by a letter-ballot of the Executive Committee of the Association:

"1. That the Division of Simplified Practice of the Department of Commerce present to producers and users of gravel the proposed commercial sizes given in Table 1.

"2. That we approve of the proposal of the Division to present the sizes to producers and users of stone, slag and gravel at the same time, with the condition that:

"(a) The standard commercial sizes shown in Table 1 be recommended for stone and slag, as well as gravel.

"(b) It be made clear that any additional sizes necessary for common uses of stone and slag apply to these materials only, and not to gravel.

"While this procedure will necessitate some further delay, it is believed strongly that the additional benefits will more than compensate for the loss of time.

"It has been proposed that additional standard sizes should be adopted to provide for special uses not taken into account by the present sizes. The Joint Technical Committee is now giving consideration to this problem and its recommendations will be presented to our Committee on Standard Specifications when they are available.

TABLE 2—SUMMARY OF RETURNS ON BALLOT

Item	Percentage of Tonnage Voting Yes	No	Not voting	Ballots not returned
1. Do you concur with the recommendations of the committee and of the convention that an effort be made to establish standard sizes for gravel?	74	0.1	5.9	20
2. If standard sizes are adopted, after following the procedure outlined in the three recommendations of the committee, will your company arrange to make your standard product conform to such of them as fall within the limits of your production? (It is understood that this agreement would not prevent the manufacture of special sizes, although, except for special purposes, their production should be discouraged.)	74	0.1	5.9	20
3. Do you concur with the committee's recommendations for standard sizes outlined in the table above?	72	2.1	5.9	20
4. If you do not concur in the sizes recommended, what sizes would you suggest?	Miscellaneous recommendations from 2% of tonnage suggesting sizes not greatly out of line with proposals of committee.			

TABLE 3—GRADING SPECIFICATIONS FOR COARSE AGGREGATE FOR PORTLAND CEMENT CONCRETE PAVEMENT OR BASE

(From Specifications of the Federal Specification Board)

Types	Designated size	Percentage retained on laboratory sieves having square openings (inches) 2-in.	1½-in.	1-in.	¾-in.	½-in.	⅜-in.	No. 4
Crushed	2 -in. to No. 4	0–5	.....	30–65	.....	70–90	.....	95–100
Stone	1½-in. to No. 4	.....	0–5	.....	30–65	.....	70–90	95–100
Gravel	1 -in. to No. 4	.....	.....	0–10	.....	40–75	.....	90–100
Blast-	¾-in. to No. 4	.....	.....	.....	0–10	.....	45–80	90–100
Furnace	2 -in. to 1-in.	0–10	30–65	85–100	.....	.....	.....	.....
Slag	1½-in. to ¾-in.	.....	0–10	45–80	85–100	.....	.....	.....

Uniform Specifications

"It was pointed out earlier in this discussion that the progress in standardization is greater than apparent on the surface. The recommendations of our committee have been made the basis of important specifications in more than one instance. In St. Louis* a committee consisting of representative engineers, architects, contractors and producers adopted grading specifications conforming to the following overall sizes stated in terms of square openings: No. 4 to 2 in., No. 4 to 1 in., No. 4 to ¾ in.

"These sizes apply to crushed stone as well as gravel, although, in the case of the No. 4 to 2 in. size, different intermediate gradings are specified for the different materials. This work was initiated by the St. Louis District office of the Association. It

*See "Simplification of Coarse Aggregate Specifications in the St. Louis District," ROCK PRODUCTS, April 25, 1931.

will be recognized that these sizes conform to those recommended by our committee. This instance also affords an illustration of the point emphasized many times—that in any one locality, it is not necessary or desirable to adopt all of the sizes recommended.

A Striking Example

"Perhaps a more striking example of the utilization of these sizes, on account of its wider influence, may be found in the grading specifications for coarse aggregate for portland cement concrete pavement or base adopted by the Federal Specifications Board. The sizes recommended by the Joint Technical Committee and accepted by the Board are outlined in Table 3. It will be recognized that, except for the 'half-sizes' (¾ to 1½-in. and 1 to 2 in.), these conform to the sizes recommended by our committee. These same specifications have been presented to committees of the American Concrete Institute and the American Society for Testing Materials for their consideration.

Size of Wire for Screens

"It has been called to our attention that in the manufacture of wire mesh screens, a large number of different wire diameters are used, and this results in considerable confusion in the minds of the purchasers. For example, one producer may specify a wire diameter of 0.135 in. and another 0.092 in., for a ½-in. opening, and similarly for the other sizes. It has been suggested that large economies to the manufacturers of wire mesh and the producer of sand and gravel might be effected by the adoption of standard wire diameters for the same sizes of openings.

"A letter has been written to representative manufacturers of wire screen to obtain from them an expression of opinion as to the feasibility of bringing about a standardization along these lines, and to learn if they consider the problem of sufficient importance to justify the calling of a preliminary meeting of interested manufacturers of wire mesh screen for the purpose of discussing the problem. If there is a favorable response to this letter, it is our purpose to request the co-operation of the National Crushed Stone Association and the National Slag Association.

Conclusion

"It is believed that the work which has been carried out by the Engineering and Research Division during the past 5½ years represents accomplishments of tangible value to the industry. With the foundation which has been established it is hoped and believed that future work will be more effective than that carried out in the past.

"The criticisms and suggestions of the members of the Association are earnestly solicited."

Ready Mixed Concrete Association to Hold 1932 Convention in Pittsburgh

THE EXECUTIVE COMMITTEE of the National Ready Mixed Concrete Association, meeting in Chicago on May 15, selected the William Penn Hotel, Pittsburgh, Penn., January 25 and 26, for its 1932 annual convention. President J. E. Burke presided at the meeting.

Business conditions in the ready mixed concrete industry, reported by the members of the committee present, were remarkably good considering business conditions as a whole. It is obvious that in spite of the depression in building construction generally, the ready mixed concrete business is more than holding its own. In some instances prices had been reduced—even more than the prices of the component materials which enter into the concrete—but in numerous other instances, prices of ready mixed concrete have remained remarkably firm.

The other business at the meeting had to do largely with the details by which the office of the National Sand and Gravel Association in Washington, D. C., and its facilities will be utilized by the National Ready Mixed Concrete Association to carry on its work. A membership drive will be started soon, and it is firmly believed that with the facilities now available, the association will have a great deal to offer its membership in the way of technical service and advice, as well as promotional work.

Hard Water Softened for Domestic Use

HOW THE HICO, Tex., well water supply is softened by the Graver cold process using 3.05 lb. lime, 1.4 lb. soda ash and 0.25 lb. $Na_2Al_2O_4$ per 1000 gal. of water is told by Roy Massingill in a recent article. Hardness is reduced from about 19 to 3 grains per gal. of water, and Fe is removed. The operation of the softening process whereby the chemicals are fed into the softening tank proportional to the flow of water is described. The softened water flows by gravity to two pressure filters and then to a 250,000-gal. covered concrete storage tank. It is then pumped to an elevated tank for distribution. Costs are given.—*Chemical Abstracts.*

New Asbestos Product

THE Celotex Co., Chicago, Ill., is offering three new products and also an improved type of standard fiber insulation board armoured on both sides with layers of asbestos cement called "Cemesto-Board." It is applicable to wainscoting, siding partitions, and walls and ceilings in metal frame structures.

Information on Manufacture and Consumption of Ready-Mixed Concrete Available

THE NATIONAL Ready Mixed Concrete Association, Washington, D. C., announces the following publications are available upon request to those interested in the manufacture or consumption of ready mixed concrete:

Estimating Quantities of Concrete, by Stanton Walker, director of engineering, National Ready Mixed Concrete Association, Washington, D. C.

Pre-Mix Concrete from the Viewpoint of the User, by Henry D. Johnson, designing engineer, Bureau of Bridges and Structures, Pittsburgh, Penn.

The Proportioning of Concrete for Strength, Durability and Impermeability, by A. T. Goldbeck, director, Bureau of Engineering, National Crushed Stone Association, Washington, D. C.

Strength Specifications for Ready-Mixed Concrete, by J. L. Shiely, J. L. Shiely Co., Inc., St. Paul, Minn.

Central-Mix Concrete in Philadelphia, by H. J. Whitten, Warner Co., Philadelphia, Penn.

Effect of Haul on Strength of Concrete. (Describes results of few tests carried out by J. L. Shiely Co., St. Paul, Minn.; not yet released for publication.)

Effect of Period of Agitating Ready-Mixed Concrete. (Describes results of tests carried out by Thompson and Lichtner Co., Inc., Boston, Mass., for the Boston Concrete Corp.; not yet released for publication.)

Canadian Mineral Resources

THE ANNUAL report of the Department of Mines, Canada, for 1929 is issued.

Notes on anhydrite tell of the successful development of further uses of this material.

Bituminous sands of northern Alberta are described. Field operations and experimental work, it is said, have made definite progress. The development of these sands is still in the experimental stages, however.

A report on the various uses of limestone in industry is then given, and the requirements and approximate market for each use. This is followed by a preliminary report on the limestones of British Columbia.

Lime Slaking Process

A NEW PROCESS for slaking lime has been patented by Wm. H. Henderson. An apparatus and mode of operation are described involving establishing an upwardly moving body of aqueous liquid having a progressively regulated rate of flow, adding, countercurrentwise, quicklime containing hydratable and soluble solids and an insoluble residue in regulated amounts and at a regulated rate, thoroughly agitating and promoting hydration and solution of the hydratable and soluble substances in a lower zone, effecting hydraulic segregation of the insoluble residue and removing the latter at the base of the apparatus and removing aqueous liquid and suspended solids at the top.—*Chemical Abstracts.*

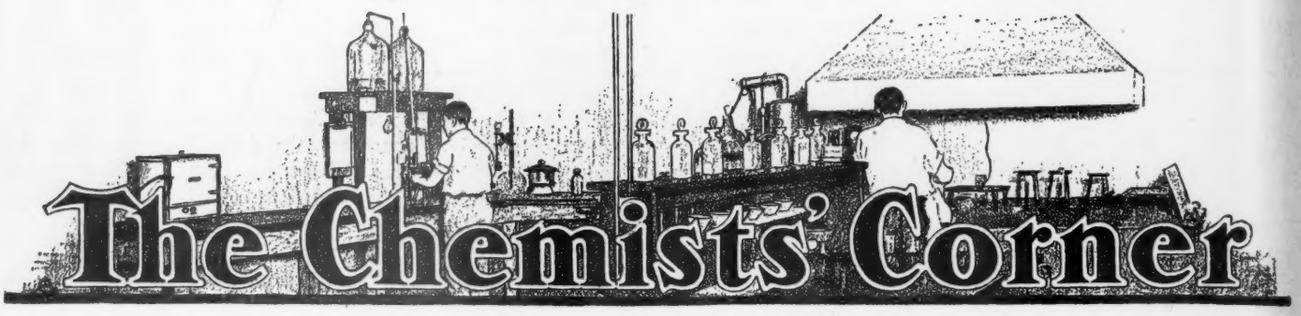


Table and Chart for Proportioning the Mix

By Arthur T. Snyder

San Francisco, Calif., Formerly With Idaho Portland Cement Co.

THE USE of the accompanying table and chart enables the chemist who is in charge of mixing or blending the slurry in a wet-process cement plant to do so in a moment's time, with no calculation. The saving of time and the greatly decreased liability of error is obvious.

Before explaining how to use this table and chart, it will be necessary to state that the table is arranged for a mix point of 77.6% $CaCO_3$, with a difference between successive $CaCO_3$ readings of 0.2%. The table has been filled in this way so that the examples which follow could be illustrated, and the figures outside of the rulings, at the top and left-hand sides of the table, will have to be changed for a different mix point, or difference between successive readings.

The mix figure must occupy the upper left-hand corner where the 77.6 now is, and the readings will increase to the right and decrease downward; for example, if the mix point were 77.0 and the difference between successive readings were 0.5, the top horizontal column would read 77.0, 77.5, 78.0, etc., and the vertical column at the left would read 77.0, 76.5, 76.0, etc., reading down. These new numbers may be printed on strips of paper and pasted over the existing ones, or, if the mix point is changed frequently, these strips may be fastened in place with thumb tacks and shifted whenever the mix point is changed.

Directions for Use of Chart

To proportion a quantity of high (above mix) slurry with a quantity of low (below mix) slurry, proceed as follows: First find the proper factor from the table by reading down and across from the figures representing the percentage of $CaCO_3$ in the tanks. Designate this figure found as f. If a straightedge is now placed on the chart in such a manner that it intersects a point on the first scale representing the amount of high slurry to be used, and at the same time intersects a point on the center scale representing the value of f just found from the table, the point at which it intersects the third scale will indicate the amount of low slurry which must be mixed with the high slurry; or, conversely, if it intersects a point on the third scale representing the amount of low slurry to be used, and also intersects f on the center scale, the amount of high slurry which must be mixed with the low slurry will be found on the first scale. If it is desired to mix a given quantity (say, m inches) of slurry, add 1.0 to the value of f and place the straightedge on this sum on the center scale and on the value of m on the third scale; the reading on the first scale will indicate the amount of high slurry which must be used, and m minus this figure will give the amount of low slurry which must be used.

Caution in Using

In reading the scales on the chart, it will be well to note several things: The center scale is a double scale, but it is possible to use only one end of this scale under any single circumstance, because use of the opposite end will run the straightedge outside the limits of one of the other scales. The scales do not show the position of the decimal point in the result, but this can be easily carried in the mind. The first scale reads from the top down, while the other two read from the bottom up; if this is not kept in mind, one may make a mistake in reading the scales.

Examples

The following three examples will illustrate the use of the table and chart under any circumstance:

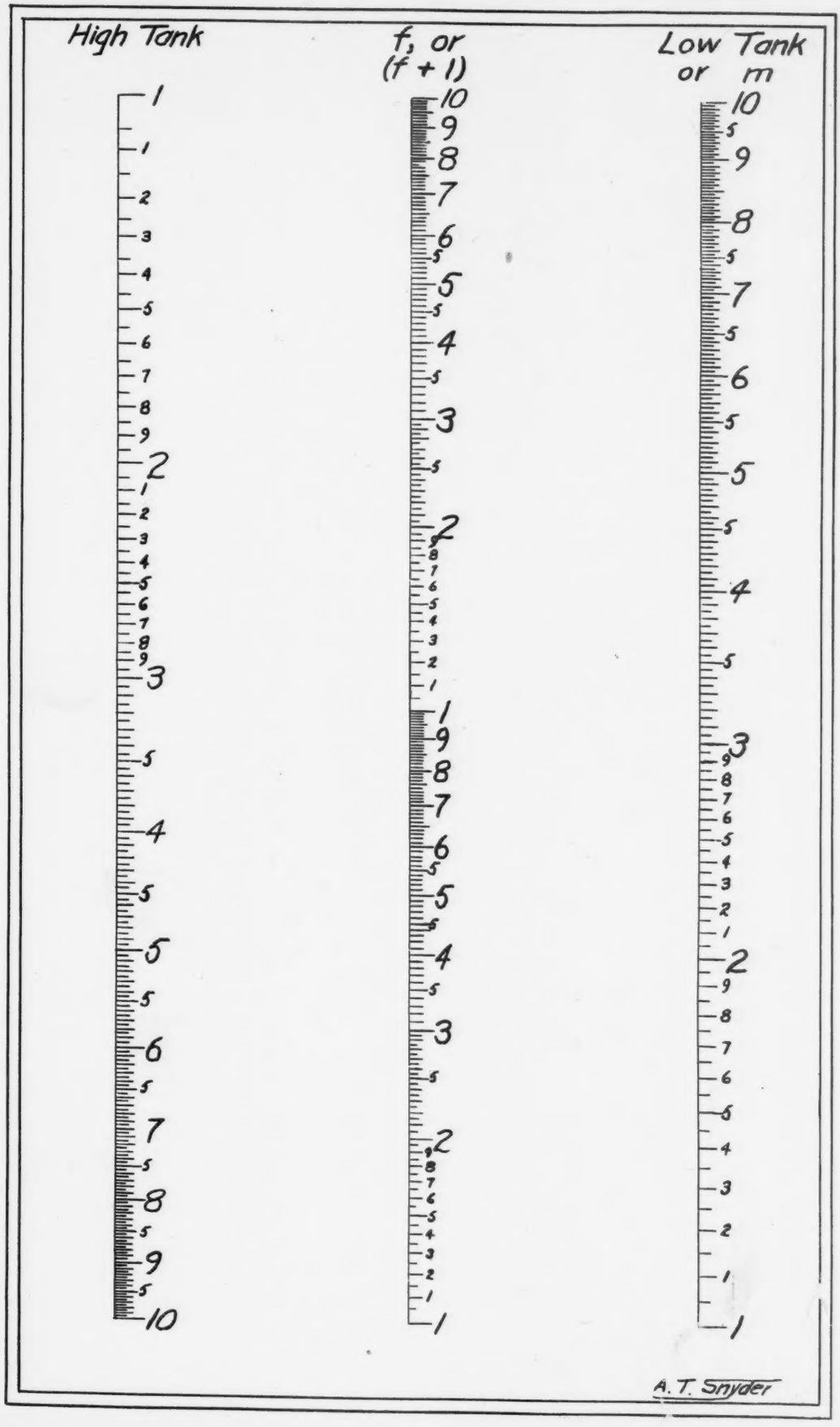
Example 1: Given tank A containing 150 in. of slurry at 79.6% $CaCO_3$, and tank B containing slurry at 74.0% $CaCO_3$. It is desired to pump enough slurry from B into A to bring A down to mix (77.6% $CaCO_3$). from the table, $f = 0.556$. By laying the straightedge on 150 on the first scale, and on 0.556 on the center scale, 83.5 is read on the third scale. Thus, 83.5 in. of slurry must be pumped from tank B into tank A. Proof: $(150 \times 79.6 + 83.5 \times 74.0) \div 150 + 83.5 = 77.597\%$.

Example 2: Given tank A containing slurry at 80.2% $CaCO_3$ and tank B containing 137 in. of slurry at 75.8% $CaCO_3$. It is desired to pump enough slurry from A into B to bring B up to mix. From the table, $f = 1.44$. By laying the straightedge on 1.44 on the center scale and on 137 on the third scale, 95.3 is read on the first scale. Thus, 95.3 in. of slurry must be pumped from tank A into tank B. Proof: $(137 \times 75.8 + 80.2 \times 95.3) \div 137 + 95.3 = 77.605\%$.

Example 3: Given tank A containing slurry at 78.8% $CaCO_3$ and tank B containing slurry at 73.2% $CaCO_3$ and an empty kiln basin, which will hold 300 in. It is desired to pump slurry from both A and B to make a 300 in. mix in the kiln basin. From the table, $f = 0.273$. Adding 1.0 to this gives 1.273. Then by placing the straightedge on 1.273 on the center scale of the chart and on 300 on the third scale, 234 is read on the first scale. This is the number of inches of slurry that must be pumped from tank A (high tank) and 300 minus 234 or 66 in. is the amount which must be pumped from tank B. Proof: $(78.8 \times 234 + 73.2 \times 66) \div 300 = 77.578\%$.

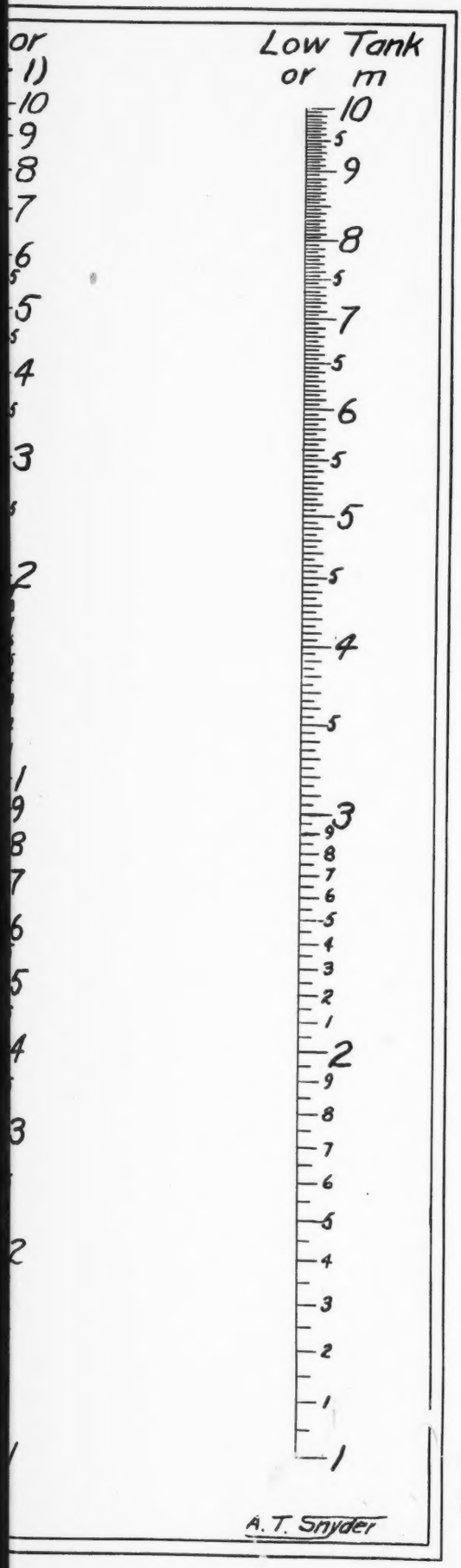
Not 100% Accurate

The chart, of course, is not absolutely accurate and cannot be made so, due to errors in drawing, printing and reading. However, it is amply accurate for the use for which it is intended. Should the occasion arise, greater accuracy may be obtained by the use of the following formulas instead of the chart: Let f = the factor found from the table; a = the amount of slurry above mix, b = the amount of slurry below



T
M

77.6	77.8	7
77.4	1.00	2
77.2	.500	1
77.0	.333	.6
76.8	.250	.5
76.6	.200	.4
76.4	.167	.3
76.2	.143	.2
76.0	.125	.2
75.8	.111	.2
75.6	.100	.2
75.4	.091	.1
75.2	.083	.1
75.0	.077	.1
74.8	.071	.1
74.6	.067	.1
74.4	.062	.1
74.2	.058	.1
74.0	.056	.1
73.8	.053	.1
73.6	.050	.1
73.4	.048	.0
73.2	.046	.0
73.0	.044	.0
72.8	.042	.0



Su

77.6
77.4
77.2
77.0
76.8
76.6
76.4
76.2
76.0
75.8
75.6
75.4
75.2
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74.8
74.6
74.4
74.2
74.0
73.8
73.6
73.4
73.2
73.0
72.8

Supplement to Rock Products, Vol. XXXIV, No. 11, May 23, 1931

Table and Chart for Proportioning Mix in Wet-Process Cement Plants

77.6	77.8	78.0	78.2	78.4	78.6	78.8	79.0	79.2	79.4	79.6	79.8	80.0	80.2	80.4	80.6	80.8	81.0	81.2	81.4
77.4	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0	19.0
77.2	.500	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00	7.50	8.00	8.50	9.00	9.50
77.0	.333	.667	1.00	1.33	1.67	2.00	2.33	2.67	3.00	3.33	3.67	4.00	4.33	4.67	5.00	5.33	5.67	6.00	6.33
76.8	.250	.500	.750	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50	3.75	4.00	4.25	4.50	4.75
76.6	.200	.400	.600	.800	1.00	1.20	1.40	1.60	1.80	2.00	2.20	2.40	2.60	2.80	3.00	3.20	3.40	3.60	3.80
76.4	.167	.333	.500	.667	.833	1.00	1.17	1.33	1.50	1.67	1.83	2.00	2.17	2.33	2.50	2.67	2.83	3.00	3.17
76.2	.143	.286	.428	.511	.714	.858	1.00	1.14	1.29	1.43	1.51	1.71	1.86	2.00	2.14	2.29	2.43	2.51	2.71
76.0	.125	.250	.375	.500	.625	.750	.875	1.00	1.12	1.25	1.37	1.50	1.62	1.75	1.87	2.00	2.12	2.25	2.37
75.8	.111	.222	.333	.444	.555	.667	.778	.889	1.00	1.11	1.22	1.33	1.44	1.55	1.67	1.78	1.89	2.00	2.11
75.6	.100	.200	.300	.400	.500	.600	.700	.800	.900	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90
75.4	.091	.192	.288	.363	.455	.545	.636	.727	.818	.909	1.00	1.09	1.18	1.27	1.36	1.45	1.54	1.64	1.73
75.2	.083	.162	.243	.333	.417	.500	.583	.666	.750	.832	.917	1.00	1.08	1.16	1.24	1.33	1.42	1.50	1.58
75.0	.077	.157	.235	.315	.385	.463	.538	.615	.692	.768	.846	.923	1.00	1.08	1.16	1.23	1.31	1.38	1.46
74.8	.071	.143	.214	.286	.375	.428	.500	.571	.643	.714	.785	.857	.929	1.00	1.07	1.14	1.21	1.29	1.37
74.6	.067	.133	.200	.267	.333	.400	.467	.533	.600	.667	.733	.800	.867	.933	1.00	1.07	1.13	1.20	1.27
74.4	.062	.125	.187	.250	.315	.375	.438	.500	.562	.625	.687	.750	.813	.875	.938	1.00	1.06	1.12	1.19
74.2	.058	.118	.176	.235	.294	.353	.412	.471	.530	.588	.647	.706	.764	.824	.882	.941	1.00	1.06	1.12
74.0	.056	.111	.167	.222	.278	.333	.389	.444	.500	.556	.611	.667	.722	.778	.833	.889	.944	1.00	1.06
73.8	.053	.105	.158	.211	.263	.316	.368	.421	.474	.526	.579	.632	.684	.737	.790	.842	.895	.958	1.00
73.6	.050	.100	.150	.200	.250	.300	.350	.400	.450	.500	.550	.600	.650	.700	.750	.800	.850	.900	.950
73.4	.048	.095	.143	.190	.238	.286	.333	.381	.428	.476	.524	.572	.619	.667	.714	.762	.810	.857	.905
73.2	.046	.091	.136	.182	.227	.273	.318	.364	.409	.454	.500	.545	.591	.636	.682	.727	.773	.818	.864
73.0	.044	.087	.130	.174	.217	.261	.308	.348	.391	.435	.478	.522	.555	.609	.652	.696	.740	.782	.826
72.8	.042	.083	.125	.166	.208	.250	.293	.333	.375	.417	.458	.500	.542	.583	.625	.667	.708	.750	.792

mix, and m the total amount of slurry made by mixing two tanks. Then,

$$b = af$$

$$a = \frac{b}{f}$$

$$a = \frac{m}{f + 1.0}$$

If the table is not large enough to cover conditions present, it may be expanded by the formula $f = \frac{A - p}{p - B}$, where A is the per cent. of $CaCO_3$ in the high slurry, B is the per cent. of $CaCO_3$ in the low slurry, p is the mix figure, and f is the factor on the table. The horizontal columns of the table progress by a constant difference, which fact makes the table easy to expand.

Outstanding Safety Records of Quarries Given Recognition

THE REMARKABLE GROWTH of the safety movement in the mining and allied industries is again demonstrated by the awards made to a large number of mines and quarries participating in the National Safety Competition for 1930 in recognition of the long-time operation of their properties with no accidents or with decidedly low accident rates. The National Safety Competition is conducted annually by the United States Bureau of Mines.

More than 300 large operations participated in the competition during 1930. Seventy-two of these went through the year without a single lost-time accident. Contestants were divided into five groups, four of them comprising underground operations, as follows: anthracite, bituminous coal, metallic ore, and nonmetallic mineral; and the fifth including quarries or open-cut mines. A replica of the bronze trophy, "The Sentinels of Safety," donated by the *Explosives Engineer*, was awarded to the winner in each group.

In the nonmetallic mine group, the trophy was awarded to the Lower gypsum mine of the United States Gypsum Co., Gypsum, Ohio, which worked 108,090 man hours without a single lost-time accident.

Honorable mention in this group was given to the Wampum limestone mine of the Crescent Portland Cement Co., Wampum, Penn., which worked 100,687 man hours without a lost-time accident; the Akron gypsum mine of the Universal Gypsum and Lime Co., Akron, N. Y., working 64,647 hours with no accidents; the Retsof rock salt mine of the Retsof Mining Co., Retsof, N. Y., working 307,214 hours with but 1 accident causing 55 days of disability; and to the No. 6 gypsum mine of the United States Gypsum Co., Plasterco, Va., which worked 151,401 hours with 3 accidents causing 62 days disability.

The winner in the quarry and open-cut mine group was the Plymouth iron mine of the Plymouth Mining Co., Wakefield, Mich., which worked 382,541 man hours without a lost-time accident.

The following-named operations in this group, which worked the number of man hours below set forth, operated without a lost-time accident:

Wakefield iron ore mine, Wakefield Iron Co., Wakefield, Mich., 331,367.

LaSalle limestone quarry, Marquette Cement Mfg. Co., LaSalle, Ill., 296,997.

Cape Girardeau limestone quarry, Marquette Cement Mfg. Co., Cape Girardeau, Mo., 224,514.

Dunwoody iron ore mine, Orwell Iron Co., Hibbing, Minn., 218,035.

Columbia Division limestone quarry, Pittsburgh Plate Glass Co., Zanesville, Ohio, 189,751.

Holston limestone quarry, American Limestone Co., Mascot, Tenn., 174,653.

Albany iron ore mine, Crete Mining Co., Hibbing, Minn., 165,875.

Sagamore iron ore mine, Sagamore Ore Mining Co., Ironton, Minn., 165,058.

Mahnomen iron ore mine, Cuyuna Ore Co., Ironton, Minn., 164,196.

Ormrod cement rock quarry, Lehigh Portland Cement Co., Ormrod, Penn., 164,193.

Mason City limestone quarry, Lehigh Portland Cement Co., Mason City, Iowa, 158,814.

Rock Hill trap rock quarry, General Crushed Stone Co., Rock Hill, Penn., 157,633.

Bennett iron ore mine, Bennett Mining Co., Keewatin, Minn., 145,871.

Fogelsville limestone quarry, Lehigh Portland Cement Co., Fogelsville, Penn., 145,790.

Spore limestone quarry, National Lime and Stone Co., Spore, Ohio, 143,000.

Nos. 5 and 6 limestone quarries, North American Cement Corp., Martinsburg, W. Va., 141,706.

Chanute limestone quarry, Ash Grove Lime and Portland Cement Co., Chanute, Kan., 133,993.

Petoskey limestone quarry, Petoskey Portland Cement Co., Petoskey, Mich., 132,725.

Dewey limestone quarry, Dewey Portland Cement Co., Dewey, Okla., 126,401.

No. 3 limestone quarry, Pennsylvania-Dixie Cement Corp., Richard City, Tenn., 118,089.

Biwabik iron ore mine, Biwabik Mining Co., Biwabik, Minn., 114,765.

Holland limestone quarry, France Stone Co., Maumee, Ohio, 104,183.

Hercules cement rock quarry, Hercules Cement Corp., Stockertown, Pa., 100,611.

Birmingham limestone quarry, Lehigh Portland Cement Co., Tarrant City, Ala., 100,320.

Greencastle limestone quarry, Lone Star Cement Co., Indiana, Inc., Greencastle, Ind., 99,712.

Clinchfield limestone quarry, Pennsylvania-Dixie Cement Corp., Clinchfield, Ga., 99,423.

Security limestone quarry, North American Cement Corp., Security, Md., 98,048.

El Paso limestone and shale quarry, Southwestern Portland Cement Co., El Paso, Texas, 95,748.

Fordwick limestone quarry, Lehigh Portland Cement Co., Fordwick, Va., 94,560.

Jamesville limestone quarry, General Crushed Stone Co., Syracuse, N. Y., 92,723.

Cement Mill limestone quarry, Lawrence Portland Cement Co., Thomaston, Maine, 91,842.

No. 4 cement rock quarry, Alpha Portland Cement Co., Martins Creek, Pa., 87,339.

Nazareth cement rock quarry, Nazareth Cement Co., Nazareth, Penn., 85,224.

Sandt's Eddy cement rock quarry, Lehigh Portland Cement Co., Sandt's Eddy, Penn., 81,795.

No. 2 limestone quarry, Southwest Stone Co., Chico, Texas, 79,442.

Dallas limestone quarry, Trinity Portland Cement Co., Dallas, Texas, 75,362.

LaSalle limestone quarry, Alpha Portland Cement Co., LaSalle, Ill., 74,844.

Iola limestone quarry, Lehigh Portland Cement Co., Iola, Kan., 73,728.

Bonneville cement rock quarry No. 1, Lawrence Portland Cement Co., Northampton, Penn., 73,431.

North Baltimore limestone quarry, France Stone Co., North Baltimore, Ohio, 69,776.

Mitchell limestone quarry, Lehigh Portland Cement Co., Mitchell, Ind., 69,536.

Catskill limestone quarry, Alpha Portland Cement Co., Cementon, N. Y., 62,245.

Dixon limestone quarry, Medusa Portland Cement Co., Dixon, Ill., 59,881.

Ridgeville limestone quarry, Mid West Rock Products Corp., Ridgeville, Ind., 59,231.

Concrete limestone quarry, Superior Portland Cement Co., Inc., Concrete, Wash., 58,972.

Spencer limestone quarry, Mid-West Rock Products Corp., Spencer, Ind., 54,909.

Oglesby limestone quarry, Lehigh Portland Cement Co., Oglesby, Ill., 54,312.

No. 7 limestone and shale quarry, Pennsylvania-Dixie Cement Corp., Portland Point, N. Y., 52,610.

Kenneth limestone quarry, France limestone Co., Logansport, Ind., 52,307.

Rocky Hill trap rock quarry, Connecticut Quarries Co., Inc., Rocky Hill, Conn., 47,405.

Alpha limestone quarry, Alpha Portland Cement Co., Alpha, Mo., 47,262.

Richmond iron ore mine, Richmond Iron Co., Palmer, Mich., 46,151.

No. 4 cement rock quarry, Pennsylvania-Dixie Cement Corp., Nazareth, Penn., 45,916.

Mildred limestone quarry, Consolidated Cement Corp., Mildred, Kan., 45,600.

Howes Cave limestone quarry, North American Cement Corp., Howes Cave, N. Y., 44,530.

New Castle limestone quarry, Lehigh Portland Cement Co., New Castle, Penn., 41,580.

Mt. Carmel trap rock quarry, Connecticut Quarries Co., Inc., Mt. Carmel, Conn., 40,522.

Trident limestone quarry, Three Forks Portland Cement Co., Trident, Mont., 37,141.

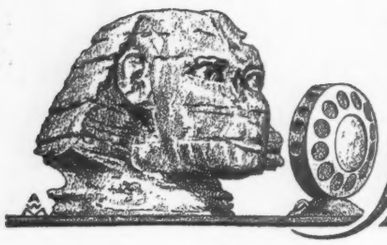
Bonner Springs limestone and shale quarry, Lone Star Cement Co. (Kansas), Bonner Springs, Kan., 34,134.

Medusa limestone quarry, Medusa Portland Cement Co., York, Penn., 31,728.

State Hospital limestone quarry, Rochester State Hospital, Rochester, Minn., 31,200.

Fredonia limestone quarry, Consolidated Cement Corp., Fredonia, Kan., 30,114.

The following-named acted as members of the Committee on Award: James F. Callbreath, secretary, American Mining Congress; W. H. Cameron, managing director, National Safety Council; A. J. R. Curtis, assistant to the general manager, Portland Cement Association; A. T. Goldbeck, director, Bureau of Engineering, National Crushed Stone Association; William Green, president, American Federation of Labor; C. B. Huntress, executive secretary, National Coal Association, and T. T. Read, professor of mining, Columbia university.



Hints and Helps for Superintendents

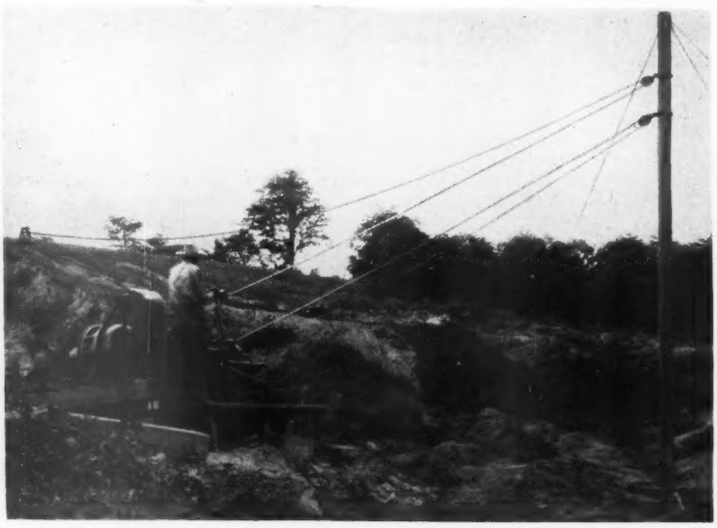
A Combination Stripping Method

AN UNUSUAL modification of the hydraulic method of stripping is being used at a silica sand quarry in the St. Louis district.

Previously the overburden, consisting of loam and clay, was washed down into waste areas by jets of water, but as the quarrying progressed a greater thickness of hard clay was encountered, which was difficult to remove readily in that manner.

The problem was solved by installing a 1-yd. Sauerman drag scraper with motor-driven hoist unit, which now scrapes the overburden to piles from which it is more easily washed down to the waste areas by large jets.

A low tail-tower is used, and by means of a hand winch this is moved along the anchor cable to shift the scraping operation. When one area has been scraped, the whole set-up is easily moved to a new location. Three quarries are worked, so that one may be drilled and one blasted while the third is being quarried. The stripping outfit can thus be kept almost continuously at work provided there is sufficient overburden to warrant it.



Motor-driven hoist unit scrapes the overburden to piles

Drag scraper helps move hard clay overburden when jetting alone fails

Repairing a Steam Shovel Break During Operating Season

By C. H. Wright
Snyder, N. Y.

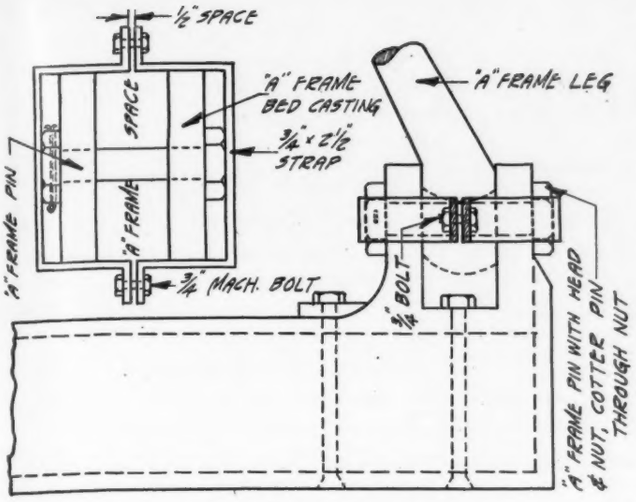
LAST YEAR in the very busy part of the season we had a very unusual break-down on our No. 2 steam shovel. The pin in the lower end of the A-frame on the right side of the shovel had broken in the center in such a way that it was not noticeable to the men operating the shovel and finally worked out. With the next load over the cars, the heavy boom and A-frame came down about half way, breaking the opposite side of the A-frame, which landed the dipper in the car, derailing the car but also helping to support the boom. Fortunately, having our two large shovels equipped with crawlers, the task of removing the boom and dipper stick from the track, which was used by the No. 2 shovel for loading, was made very easy.

We pulled No. 1 shovel out of the cut and used it to hoist the boom of No. 2 shovel clear of the track so operations could be resumed. In this operation we placed the dipper of No. 1 shovel under the boom of No. 2 shovel in such a way that it raised the boom and set the A-frame on the right-hand side back in the socket again. Having an A-frame pin ready, it caused a delay of only one hour and 10 minutes from the time the delay started until the wheels of operation were rolling again. The break-down happened at 1:30 p. m., and the next day at 1 o'clock No. 2 shovel was operating again and without an hour of overtime. As soon as the break-down was investigated, a telegram was sent to the shovel manufacturer, and the next morning the new A-frame was on the job, being delivered that night by truck.

To install the new A-frame leg, it was necessary to remove the dipper sticks, lower the boom and lower the A-frame, remove the broken leg and replace it with the new one. After all the work was completed the next day at 1:00 o'clock after the break-down, everything was working as though nothing had happened.

An Improved Method of Holding Pin

The reason why I changed the idea of having just straight pins with holes drilled in them for cotter pins at the lower end of the A-frame was that several times I found the cotter pins cut out and the pin worked out, but not far enough to do any real damage. Then I made up these pins with head and nut and a cotter pin through the nut, thinking surely I had this bad feature remedied, but we still had trouble. It was one of these pins that had broken in the center and worked out that caused the boom to fall. Then



Clamp holds A-frame cotter pin intact

I made a clamp as the little sketch will illustrate.

The suggestion was advanced, "Why did you not put in a set screw to hold these pins in place?" Just simply for this one reason—no doubt the set screw would hold, it is quite probable, but to my way of thinking, it is not practical. The longer the set screw is used in such or similar places, the deeper it embeds itself in the shaft, oftentimes burning the end of the set screw, making it a very hard task to turn out the set screws when it is necessary to remove the shafting. Quite frequently, this particular trouble has been encountered in working around steam shovels and cranes, and considerable time has been lost when the set screw had to be drilled out. And again, where a set screw is used in cast-iron of 2 in. or more thickness, corrosion takes place, often ripping the thread out of the casting or twisting off the head of the set screw. Then the only thing left to do is to submit to the ratchet and drill or an air-powered drilling machine.

Plastic Rubber Lining Increases Life of Gravel Spreader Table

THE Great Eastern Gravel Corp., Port Jefferson, Long Island, N. Y., operates a large suction dredge, with a 20 in. centrifugal pump, for the production of commercial sand and gravel, washing and screening all material on board the boat. Approximately 500 cu. yd. of solid materials per hour is discharged with considerable force on a spreading table to be fed to the screens.

The dredge pumps 36,000 tons of water, sand, gravel, cobble and boulders weighing up to 80 lb. through a 24-in. main from the depth of 30 to 50 ft. to the spreading table, which is 100 ft. above the water line.

The original construction was as follows: Four-inch planking with ¼-in. steel plates bolted over the 244 sq. ft. area in front of the screens. The boiler plate lasted three or four weeks.

To obtain longer service, all plates were removed. A cushion of split truck tires vulcanized into a solid mass was spiked and bound to the 4-in. planking. This was necessary because the 4-in. planking was severely worn and saturated with salt water. After this cushion base was laid on the planking, a mat of "Colvule" plastic rubber, ½-in. thick, was bound by binder to the truck tires. After three months there is no sign of wear.

Sand Classifiers

AT THE NEW PLANT of the Montgomery Gravel Co., Montgomery, Ala., the nature of the bank material is such that it has proven difficult to grade a sand with sufficient fines present. The bank material is deficient in the first place, so that every effort must be made to retain the finer sands.

The operators were not successful in the use of cones so they constructed two parabolic steel tanks, each 24 ft. long and each provided with four outlets equally spaced along the bottom. One of the boxes is for concrete sand and the other mason's sand. The material enters the plant from the pipe line and passes over two spreading tables, each one of which is followed by a stationary screen; the throughs from one screen being the concrete sand and from the other the finer mason's sand. Each flows to its respective settling box.

The material enters one end of the box and the sludge flows out the other end. The sand is drawn out by hand operation from any of the four spigots direct to cars, there being no storage space provided for the sand.

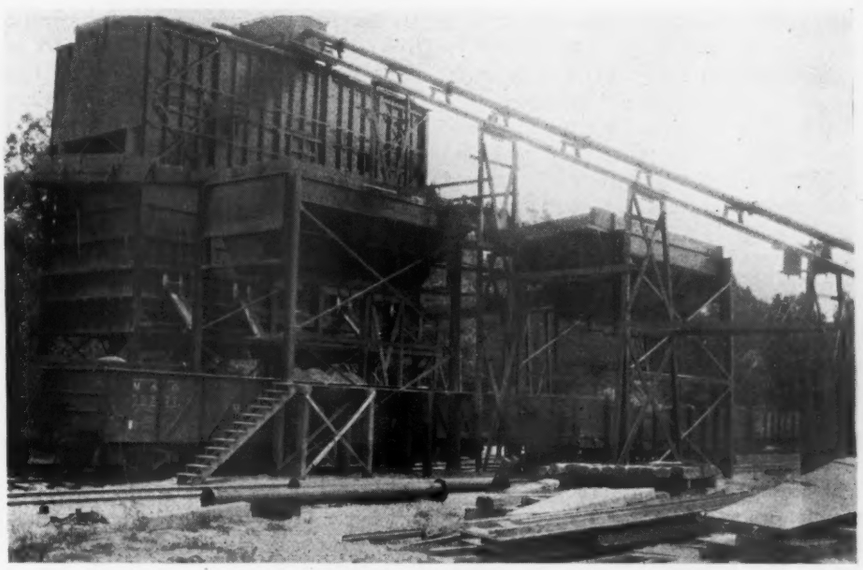
There is some segregation in these classifiers, the feed end delivering a coarser product than the lower end, but it is not serious, and J. A. Hanner, superintendent, intends shortly to place a chute under each classifier and draw from the four spigots in such a fashion that the products will be mixed before striking the car. At present only the two center spigots are used.

By the use of this simple arrangement a satisfactory sand has been a regular feature of the plant's output.

Addendum

IN THE April 25 issue of ROCK PRODUCTS, an article, "Saving Money by Attention to Details," described the savings that resulted in the new plant of the Montgomery Gravel Co., near Montgomery, Ala., by attention to details. In this plant the pipe line was shown entering the plant at the top center. It was pointed out that this eliminated a 90 deg. elbow in getting into the plant. The savings that resulted in operation costs were cited.

T. F. Wallace, general manager of the Montgomery Gravel Co., calls attention to the fact that this elimination, used with the split spreading table, permitted a double screen layout instead of in series. This layout contributed to a large saving in vertical lift, and, as mentioned in the original article, permits efficient operation of one side of the plant in emergencies.



Parabolic steel tanks help to retain the finer sands at this plant

Rock Products Clinic

Railway Company Activity in Promoting New Plants

THE EDITOR of ROCK PRODUCTS is consistent in protecting, so far as he can, the industry this journal represents from the onslaughts of would-be producers, who have not realized, or do not attempt to realize, that something more than abundant raw materials and a plant are necessary for successful operation.

Consequently, we believe that railway company industrial development departments make a mistake in trying to promote new plants, where economic factors may make their success improbable, or even impossible. We know of one case where a railway company has been active in promoting an unneeded new gravel plant, and numerous producers on its lines are purposely endeavoring to route their shipments over other lines, so far as possible, in retaliation.

The Editor Writes to a Railway President

Mr. L. A. Downs, President,
Illinois Central Railroad:

You determine the business policies of the Illinois Central railroad for which I have great admiration as a "go-getting" business organization.

ROCK PRODUCTS, as the established business journal of the cement, lime, gypsum, crushed stone, sand and gravel and allied industries, is a factor in forming the opinions of that part of the public represented by producers of these materials, in regard to such things as the attitude of the Illinois Central railroad toward certain phases of these industries.

The reason for my writing this letter is that *The Business Week* of March 11 contains a story in regard to your industrial survey of territory served, in which it is stated, "Cement might be made at several points, with a large program of hard road development in the South promising a good local market. There is now no cement plant in Mississippi."

As ROCK PRODUCTS has taken a rather active part in attempting to discourage the building of a cement plant in Mississippi at this time, as you will note from the enclosed clipping of our editorial page of October 11, 1930, and as we have consistently taken a similar attitude in regard to the unjustified encouragement of new plants by chambers of commerce and other industrial booster organizations, as you will see by reference to the tear sheet of an editorial in ROCK PRODUCTS, July 21, 1928, I am curious to know just how an organization with the experience and prestige of the Illinois Central railroad justifies its attitude in respect to the encouragement of such new industries on its lines.

The cement used in the state of Mississippi today is probably very largely hauled over your lines from Birmingham, New Orleans, Nashville and Chattanooga. Just wherein does the Illinois Central benefit by encouraging a new cement mill or cement mills in Mississippi, thus cutting off the service it is now rendering shippers on its lines in other states?

Wholly aside from the fact that the present productive capacity of the portland cement industry is not being utilized to greater than 60% of its capacity, and there is little prospect that its capacity will be utilized, even in the South with the present prospective road work, to over 75% within the next two or three years, what advantage does the Illinois Central railroad expect to gain from the encouragement of the building of plants to serve local territories?

Won't a large part of the business of these local plants as they are increasingly established be hauled by motor truck rather than by rail? That has been my observation of the cement industry—that a large part of the new production in the last five years has been the building of plants to serve local territories such as Buffalo, Birmingham, Pittsburgh, etc., taking away just so much business from the older, longer established plants in the Lehigh Valley and elsewhere which were handicapped by long rail hauls.

By what mode of reasoning does your industrial department arrive at the conclusion that the railway will be benefited by encouraging the building of more such local plants? We will grant that such local plants will, in some instances, get enough business to keep them alive, but since only 60% of the capacity of the industry is being utilized, it is obvious that what business they obtain will be at the expense of the older established companies, so wherein do the railway carriers gain, the public which invests in cement plants, or anybody else?

As I have already written, with the admiration that I have for the Illinois Central railroad as a business organization, I am very curious indeed to know your mode of reasoning which justifies your going out and encouraging the building of a cement plant on your lines in Mississippi or anywhere else, at the present time.

* * * * *

Mr. Downs' Reply

Your letter of March 10 is received. I believe you have mistaken the purpose of our industrial survey. We aimed to develop comprehensive, accurate information of the resources and other industrial advantages of our territory, primarily for the information of operators who are considering the location of new or branch plants, and the information developed is being so used. I am sure you recognize that a general industrial survey could not possibly cover the wide range of problems encountered in many different lines of industry.

I am not prepared to enter into a discussion with you as to whether or not the establishment of a new or branch plant in Mississippi would be beneficial to a cement manufacturer, and that question is entirely beside the point. If any cement manufacturer is considering such a location, we shall be glad to render every possible assistance in helping him to determine the answer to that question. Naturally we want prosperous industries.

I realize that we may seem to be working against our own interest in promoting the industrialization of agricultural areas. The immediate view would be that our selfish interest would best be served by having one part of our territory devoted entirely to agriculture and another part devoted entirely to industry. That view, however, does not stand up under examination. The best thought of our times is that economic stabilization lies in diversification, and we have seen that result of the diversification of both agriculture and industry in Mississippi in recent years. It is true that the diversification process tends to shorten the average rail haul, but we meet that issue with the realization that what is best for our territory is best for us.

Carrying your thought to its ultimate conclusion, there would be no progress in any industry where capacity exceeds the current demand for products. I cannot accept that line of reasoning. The need of progress is ever existent, and we conceive it to be our duty to do our part in working out the industrial progress of our territory.

I have a very deep appreciation of your admiration for our railroad, and I acknowledge with gratitude the interest which prompted your letter.

(Signed) L. A. DOWNS.

Editor's Note

THIS DEPARTMENT of Rock Products is for the free exchange of ideas of any reader on any relevant subject. We sincerely hope our readers will use it freely. Probably producers as well as the editor have had exchanges of words with railway officials. Why not tell readers about them?

Editorial Comment

Trends in Cement Making

Periods of depression are often prolific of inventions, brought out by the urge to meet competition by producing at a lower cost a better product. Probably that is why the patents published in the past three months show an unusual number issued for cements and cement-making processes and machinery. These have been, or will be, reviewed in our regular patent review section, but it is interesting to consider them here as showing the trends the making of cement is taking.

There is little that is really novel in the lot. In fact very few real novelties have been introduced to the industry in the past quarter century, that is to say, novelties which had any lasting quality. High alumina cement is the outstanding example and that has not made the progress that was predicted for it.

In the patents reviewed, one, that of Wilner, has an element of novelty. It calls for a combination of about 22½% of burned lime with 77½% of clay or silicious earth that has been heated to 800 deg. C. in order to make some of the silica colloidal. The object is to produce a cement in which all the lime is "fixed" in the hydrating and hardening process—thus ensuring a more durable concrete. During the war similar cements were made in Germany by combining burned lime with igneous rocks containing silica, and these needed no heating. The very moderate success of all such cements does not indicate that a strong competitor to portland cement in strength qualities will ever be made in that way.

Two processes, those patented by La Forge and Colton, add clinker to the raw mix. The former adds unground clinker and grinds it in, the latter adds ground clinker to the ground raw mix. The patentee claims that the clinker acts as a catalyzer, enabling the materials to clinker at a lower heat, and he also claims that a high-early-strength cement is made in that way. Only 20% of ground clinker is added so this is a method for producing a high-early-strength cement by double grinding and double burning only one-fifth of the raw material instead of all of it as is supposed to be done in making at least one well known quick-hardening cement.

Of the various patented methods of modifying portland cement, perhaps the most interesting is that of Olson who grinds the clinker with dry chlorine gas. He claims this gives a cement that is non-hygroscopic and which has all the good qualities of portland cement used with calcium chloride. Reubke, a German inventor, claims to obtain the same result (and a non-hygroscopic cement) by adding 1% to 3% of sulphide of calcium. His patent specification gives test figures showing a considerable increase in strength at all ages and a lessened time of hardening over ordinary portland cement.

There are quite the usual number of patents covering kilns and details of kilns. One of the most interesting is the kiln of Horn and Nissley. It is a regular rotary kiln except that it has been very carefully designed to do four things: To keep out all air except a regulated amount needed for combustion, to supply air to where any unburned fuel in the gases will be consumed, to put in the feed so that none of it will be carried by the draft into the stack, and to thoroughly mix the fuel and air and preheat them by radiation from the cooling clinker. Several others of the patents examined cover methods of feeding slurry. One of these is the Bessemer method of feeding the cake from filter presses which was described in the March 28 issue of Rock Products at the Arkansas Portland Cement Co. plant. While other inventors are trying to keep slurry from getting into the stack, Newhouse in his proposal puts it into the stack, allowing it to fall to the bottom through the ascending column of hot gas. Two screw conveyors and an elevator pick it up and carry it into the kiln after it is dried. It is evident that much attention is being given to greater utilization of the waste heat. A method of drying slurry filter cake with waste heat, said to have been done successfully in a German portland cement plant, was exhibited at the recent Chemical Show in New York.

From a theoretical as well as a practical point of view, the patent specification of Miller and Newhard, covering a method of preparing cement raw material, is well worth reading. It is really a treatise on the preparation of raw materials. It is their contention that ordinary raw grinding makes too much flour in order to get the rest of the material to a size that will fuse easily. The magma resulting from the fusion of this flour retards the fusion of the remainder. They have patented a system of comminutors, air separators, screens and tube mills which they claim avoids this, producing a meal that will fuse at a low temperature with less power cost for grinding. The correct size of raw material flour is another subject for intensive invention and research. Apparently this size will vary somewhat with the nature of the raw materials.

Although so many inventors are working on cement and its manufacture there is nothing in the present patents to indicate that a successor to portland cement, or any radical change in cement manufacture, is in sight. It seems probable that the cement mills built in the next few years will strongly resemble those that have been built in the past few years, except for further labor-saving refinements, and more provision for instrumental control of processing.

Financial News and Comment

RECENT QUOTATIONS ON SECURITIES IN ROCK PRODUCTS CORPORATIONS

Stock	Date	Bid	Asked	Dividend
Allentown P. C. 1st 6's[27]	5-18-31	95	100	
Alpha P. C. new com.[2]	5-18-31	12	12½	25c qu. Apr. 25
Alpha P. C. pfd.[2]	5-18-31	114	120	1.75 qu. Mar. 14
Amalgamated Phosphate Co. 6's 1936[19]	5-18-31	99½	100½	
American Aggregates com.[13]	5-18-31	5	10	75c qu. Mar. 1
American Aggregates pfd.[13]	5-18-31	65	75	1.75 qu. Apr. 1
American Aggr. 6's w.w.[19]	5-18-31	65	75	
American Aggr. 6's ex. w.[19]	5-18-31	62	72	
American Brick Co., sand-lime brick	5- 4-31	.....	7	25c qu. Feb. 1, '30
American Brick Co. pfd.	5- 4-31	52¼	57	50c qu. May 1, '30
Am. L. & S. 1st 7's[19]	5-18-31	95	98	
American SilicaCorp. 6½'s[39]	5-20-31	No market		
Arundel Corp. new com.	5-19-31	37¾	.....	75c qu. Apr. 1
Beaver P. C. 1st 7's[20]	5-14-31	No market		
Bessemer L. & C. Cl. A[4]	5-15-31	.....	27	75c qu. May 1
Bessemer L. & C. 1st 6½'s[4]	5-15-31	80	83½	
Bloomington Limestone 6's[37]	5-18-31	57	59	
Boston S. & G. new com.[37]	5-16-31	10	12½	30c qu. Apr. 1
Boston S. & G. new 7% pfd.[37]	5-16-31	38	44	87½c qu. Apr. 1
California Art Tile A	5- 1-31	.....	5½	43¾c qu. Mar. 31
California Art Tile B[40]	5-14-31	.....	4	20c qu. Mar. 31
Calaveras Cement com.[35]	5-14-31	5	.....	
Caleveras Cement 7% pfd.[35]	5-14-31	65	.....	1.75 qu. Apr. 15
Canada Cement com.	5-19-31	9⅞	10	
Canada Cement pfd.	5-19-31	93¼	94½	1.62½ qu. Mar. 31
Canada Cement 5½'s[34]	5-15-31	99¾	100½	
Canada Cr. St. Corp. bonds[34]	5-15-31	87	93	
Certainteed Prod. com.	5-19-31	3⅞	4	
Certainteed Prod. pfd.	5-19-31	15	24	1.75 qu. Jan. 1
Cleveland Quarries	5-19-31	.....	60	75c qu. June 1
Columbia S. & G. pfd.	5-19-31	93¾	95	
Consol. Cement 1st 6½'s, A[44]	5-20-31	25	30	
Consol. Cement notes, 1941[23]	5-20-31	No market		
Consol. Cement pfd.[27]	5-18-31	10	20	
Consol. Oka S. & G. 6½'s[12] (Canada)	5-16-31	99	101	
Consol. Rock Prod. com.[9]	5-14-31	50c	75c	
Consol. Rock Prod. pfd.[9]	5-14-31	4½	5	43¾c qu. June1,'30
Consol. Rock Prod. units	5-18-31	.....	8	
Consol. S. & G. pfd. (Can.)	5-19-31	.....	74	1.75 qu. May 15
Construction Mat. com.	5-16-31	7½	8¼	
Construction Mat. pfd.	5-16-31	25	32½	87½c qu. May 1
Consumers Rock & Gravel, 1st Mtg. 6's, 1948[35]	5-14-31	70	75	
Coosa P. C.1st 6's[27]	5-18-31	49	52	
Coplay Cem. Mfg. 1st 6's[33]	5-16-31	95	.....	
Coplay Cem. Mfg. com.[33]	5-16-31	5	7½	
Coplay Cem.Mfg. pfd.[33]	5-16-31	25	40	
Dolese & Shepard	5-19-31	48	52	$1 Apr. 1
Dufferin Pav. & Cr. Stone com.	5-19-31	2	6	
Dufferin Pav. & Cr. Stone pfd.	5-19-31	71	75	1.75 Apr. 1
Edison P. C. com.[32]	5-15-31	1	.....	
Edison P. C. pfd.[32]	5-15-31	5	.....	
Federal P. C. 6½'s, 1941[19]	5-18-31	96	100	
Giant P. C. com.[2]	5-18-31	2	4	
Giant P. C. pfd.[2]	5-18-31	10	20	1.75 s.-a. Dec. 15
Gyp. Lime & Alabastine, Ltd.	5-19-31	8	8½	20c qu. Apr. 1
Hermitage Cement com.[31]	5-16-31	15	25	
Hermitage Cement pfd.[31]	5-16-31	75	81	
Ideal Cement, new com.	5-19-31	35	40	75c qu. Mar. 31
Ideal Cement 5's, 1943[29]	5- 2-31	98	100	
Indiana Limestone units[27]	5-18-31	50	60	
Indiana Limestone 6's	5-19-31	35 act. sale		
International Cem. com.	5-19-31	29¼	29¾	$1 qu. Mar. 31
International Cem. bonds 5's	5-18-31	82½ act. sale		Semi-ann. int.
Iron City S. & G. bonds 6's[30]	5- 2-31	85	.....	
Kelley Is. L. & T. new stock	5-19-31	.....	28	62½c qu. Apr. 1
Ky. Cons. St. V. T. C.[38]	5-16-31	5	8	
Ky. Cons. Stone 6½'s[38]	5-16-31	75	80	
Ky. Cons. Stone com.[38]	5-16-31	5	8	
Ky. Cons. Stone pfd.	5-19-31	75	85	1.75 qu. May 1
Ky. Cons. St., trustee ctfs.[38]	5-16-31	75	80	
Ky. Rock Asphalt com.[11]	5-16-31	4	5	40c qu. Oct. 1, '30
Ky. Rock Asphalt pfd.[11]	5-16-31	70	75	1.75 qu. June 1
Ky. Rock Asphalt 6½'s[11]	5-16-31	96	100	
Ky. Rock Asphalt war.	5-19-31	7	12	
Lawrence P. C.[2]	5-18-31	49	54	$1 qu. Mar. 31
Lawrence P. C. 5½'s, 1942[2]	5-18-31	85½	87½	
Lehigh P. C.	5-19-31	12	13	25c qu. May 1
Lehigh P. C. pfd.	5-19-31	95	96	1.75 qu. July 1
Louisville Cement[45]	5-14-31	175	225	
Lyman-Richey 1st 6's, 1932[13]	5-15-31	97	.....	
Lyman-Richey 1st 6's, 1935[13]	5-15-31	95	.....	
Marblehead Lime 6's[34]	5-15-31	No market		
Marbelite Corp. com. (cement products)	5- 2-31	1	.....	
Marbelite Corp. pfd.	4-17-31	4	.....	50c qu. Oct. 10, '30
Material Service Corp.	5-19-31	24	24½	50c qu. June 1
McCrady-Rodgers 7% pfd.[22]	5-14-31	47	.....	87½c qu. Mar. 30
McCrady-Rodgers com.[22]	5-14-31	15	21½	75c Jan. 26
Medusa Portland Cement	5-19-31	.....	60	75c qu. Apr. 1
Michigan L. & C. com.[6]	5-16-31	45	.....	
Missouri P. C.	5-19-31	21	22	50c qu. Apr. 30
Monolith Portland Midwest[9]	4-30-31	1	2	
Monolith P. C. com.[9]	5-14-31	1	2	40c s.-a. Jan. 1
Monolith P. C. pfd.[9]	5-14-31	2	3	40c s.-a. Jan. 1
Monolith P. C. units[9]	5-14-31	5	7	
Monolith P. C. 1st Mtg. 6's[9]	5-14-31	73	77	
National Cem. (Can.) 1st 7's[34]	5-15-31	98½	.....	
National Gypsum A com.	5-19-31	4½	5	
National Gypsum pfd.	5-19-31	47½	49½	$1 Apr. 1
Nazareth Cement com.[25]	5- 2-31	14	.....	
Nazareth Cement pfd.[25]	5- 2-31	95	.....	
Newaygo P. C. 1st 6½'s[27]	5-18-31	101	.....	
New England Lime 1st 6's[19]	5-18-31	.....	60	
N. Y. Trap Rock 1st 6's	5-18-31	99¾ act. sale		
N. Y. Trap Rock 7% pfd.[30]	5-18-31	95	.....	1.75 Apr. 1
North Amer. Cem. 1st 6½'s	5-16-31	39	.....	
North Amer. Cem. com[27]	5-18-31	2	4	
North Amer. Cem. 7% pfd.[27]	5-18-31	16	20	
North Shore Mat. 1st 5's[18]	5-20-31	90	.....	
Northwestern States P. C.[31]	4-18-31	95	.....	$2 Apr. 1
Ohio River Sand com.	5-19-31	.....	14	
Ohio River Sand 7% pfd.	5-19-31	.....	98	
Ohio River S. & G. 6's[16]	5-16-31	80	95	
Oregon P. C. com.[9]	5-14-31	8	12	
Oregon P. C. pfd.[9]	5-14-31	80	85	
Pacific CoastAggr. com.[40]	5-14-31	.....	1½	
Pacific Coast Aggregates pfd.	5-18-31	2½	3½	
Pacific Coast Cement 6's[5]	5-14-31	64¼	74¼	
Pacific P. C. com.[5]	5-14-31	14¼	17¼	
Pacific P. C. pfd.[5]	5-14-31	57¾	74	1.62½ qu. Apr. 4
Pacific P. C. 6's[5]	5-14-31	97¼	98	
Peerless Cement com.[1]	5-15-31	1½	2½	
Peerless Cement pfd.[1]	5-15-31	60	70	1.75 qu. Apr. 1
Penn.-Dixie Cement com.	5-19-31	2½	3	
Penn.-Dixie Cement pfd.	5-19-31	14⅛	16½	
Penn.-Dixie Cement 6's	5-19-31	60	60⅛	
Penn. Glass Sand Corp. 6's	5- 6-31	100½	102	
Penn. Glass Sand Corp. pfd.	5- 6-31	90	.....	1.75 qu. Apr. 1
Petoskey P. C.	5-19-31	5	6	15c qu. Apr. 1
Port Stockton Cem. com.[9]	5-14-31	No market		
Riverside Cement com.[5]	5-14-31	8¼	10	
Riverside Cement pfd.[20]	5-14-31	66	68	1.50 qu. May 1
Riverside Cement, A[20]	5-14-31	7	10	15c qu. Feb. 1
Riverside Cement, B[20]	5-14-31	1	2	
Roquemore Gravel 6½'s[17]	5-16-31	98	100	
Sandusky Cement 6½'s, 1931-37[19]	5-18-31	90	100	
Santa Cruz P. C. com.[5]	5-14-31	85¼	90¼	$1 qu. Apr. 1
Schumacher Wallboard com.	5- 1-31	8⅛	10	25c qu. Mar. 27
Schumacher Wallboard pfd.	5- 1-31	.....	21	50c qu. May 15
Southwestern P. C. units[35]	5-14-31	240	.....	
Standard Paving & Mat. (Canada) com.	5-19-31	10	10½	50c qu. May 15
Standard Paving & Mat. pfd.	5-19-31	.....	75	1.75 qu. May 15
Superior P. C., A[20]	5-14-31	34½	37	27½c mo. June 1
Superior P.C., B[20]	5-14-31	13	14¾	25c qu. Mar. 20
Trinity P. C.units[31]	4-18-31	105	.....	
Trinity P. C. com.[31]	4-18-31	17½	30	
Trinity P. C. pfd.[27]	5-18-31	105	.....	
U. S. Gypsum com.	5-19-31	37½	38½	40c qu. June 30
U. S. Gypsum pfd.	5-19-31	130	133	1.75 qu. June 30
Wabash P. C.[21]	5-16-31	.....	21	
Warner Co. com.[16]	5-16-31	21	28	50c qu. Apr. 15
Warner Co. 1st 7% pfd.[16]	5-16-31	.....	95	1.75 Apr. 1
Warner Co. 1st 6's w. w.	5-18-31	93 act. sale		
Whitehall Cem. Mfg. com.[30]	5-18-31	80	.....	
Whitehall Cem. Mfg. pfd.[30]	5-18-31	50	.....	
Wisconsin L. & C. 1st 6's[15]	5-20-31	90	.....	
Wolverine P. C. com.	5-19-31	2¼	2¾	15c qu. Nov. 15
Yosemite P. C., A com.[9]	5-14-31	2½	3½	

Quotations by: [1]Watling Lerchen & Hayes Co., Detroit, Mich. [2]Bristol & Willett, New York. [3]Rogers, Tracy Co., Chicago. [4]Butler, Beadling & Co., Youngstown, Ohio. [5]Smith, Camp & Co., San Francisco, Calif. [6]Frederic H. Hatch & Co., New York. [7]J. J. B. Hilliard & Son, Louisville, Ky. [8]Dillon, Read & Co., Chicago, Ill. [9]A. E. White Co., San Francisco, Calif. [10]Lee Higginson & Co., Boston and Chicago. [11]J. W. Jakes & Co., Nashville, Tenn. [12]James Richardson & Sons, Ltd., Winnipeg, Man. [13]Stern Bros. & Co., Kansas City, Mo. [14]First Wisconsin Co., Milwaukee, Wis. [15]Central Trust Co. of Illinois. [16]J. S. Wilson, Jr., Co., Baltimore, Md. [17]Citizens Southern Co., Savannah, Ga. [18]Dean, Witter & Co., Los Angeles, Calif. [19]Hewitt, Ladin & Co., New York. [20]Tucker, Hunter, Dulin & Co., San Francisco, Calif. [21]Baker, Simonds & Co., Inc., Detroit, Mich. [22]Peoples-Pittsburgh Trust Co., Pittsburgh, Penn. [23]A. B. Leach & Co., Inc., Chicago, Ill. [24]Richards & Co., Philadelphia, Penn. [25]Hincks Bros. & Co., Bridgeport, Conn. [26]Bank of Republic, Chicago, Ill. [27]National City Co., Chicago, Ill. [28]Chicago Trust Co., Chicago, Ill. [29]Boettcher & Co., Denver, Colo. [30]Hanson and Hanson, New York. [31]S. F. Holzinger & Co., Milwaukee, Wis. [32]Tobey and Kirk, New York. [33]Steiner, Rouse and Co., New York. [34]Jones, Heward & Co., Montreal, Que. [35]Tenney, Williams & Co., Los Angeles, Calif. [36]Stein Bros. & Boyce, Baltimore, Md. [37]Wise, Hobbs & Arnold, Boston. [38]E. W. Hays & Co., Louisville, Ky. [39]Blythe Witter & Co., Chicago, Ill. [40]Martin Judge Co., San Francisco, Calif. [41]Hemphill, Noyes & Co., New York City. [42]Nesbitt, Thomas & Co., Montreal. [43]Foreman State-National Bank, Chicago. [44]E. H. Rollins, Chicago. [45]Dunlap, Wakefield & Co., Louisville, Ky.

New England Lime Co. Statement

PRESIDENT CHAUNCEY C. LOOMIS of the New England Lime Co., Pittsfield, Mass., has issued a notice to stockholders of the company, which in part is quoted as follows:

The company defaulted in payment of dividends on preferred stock on October 1, 1929, since which time general business conditions have become worse and have affected the affairs of the company to such extent that on July 1, 1930, it defaulted in the sinking fund provisions of its bonds and also failed to pay interest on the bonds on January 1, 1931. In consequence a bondholders' protective committee was formed in August, 1930, which has the power to foreclose under the terms of the mortgage.

The operations of the company for the fiscal year ended November 30, 1930, resulted in a cash loss from operations of $29,379.72. This cash loss, plus other charges including accumulated interest on bonds, provision for depreciation, depletion and amortization of bond discount, but excluding sinking fund requirements, caused a total net loss of $242,170.84.

Total net sales for 1930 were $287,906.05 less than the preceding year, which accounts for the larger part of this loss. Recognizing the downward trend of sales, certain changes were made, with the approval of the committee, in the active management and, further, at the suggestion of the committee a program of economies was put into effect which resulted in a much improved showing during the last quarter of the year, as evidenced by the "Summary of Profit and Loss by Quarterly Periods" shown in this report.

During this last quarter the company earned cash profits shown in the summary as income available for interest of $12,164.18, despite the fact that this was a low volume quarter, whereas the preceding quarters show a cash loss. As a result of the economies previously mentioned, it will be noted that selling and administrative expenses decreased approximately $21,000 during this quarter.

The first quarter of the present year reflects still further improvement from a standpoint of lowered costs and expenses. During the quarter ended February 28, 1931, the company on a total sales volume of only $133,011.02 was able to operate and show a cash loss of only $48.22. Cost of sales for this quarter was 3.5% lower than for the quarter ended November 30, 1930, while selling and administrative expenses declined from $47,656.11 to $38,652.33. The operations of the company during the existence of the committee, as shown by the statement appearing later in this report, resulted in a cash profit (shown in the statement as income available for interest) of $12,115.96, despite a very low sales volume. This low volume is due to the fact that the business of the company is seasonal.

The audited balance sheet of the company as of November 30, 1930, shows current assets consisting principally of inventories and outstanding accounts of $256,084.02, and current liabilities of $83,428.91, making a net working capital of $172,655.11. In the current liabilities there is included an item of $29,512.50, which represents interest accrued on bonds from July 1, 1930, to November 30, 1930, which the company was not in position to pay on January 1, 1931, when due. This balance sheet also shows a book value of properties of $3,414,634.09, consisting of plants, buildings, machinery and limestone deposits.

Recent Dividends Announced

Kentucky Consolidated Stone pfd. (qu.)	$1.75,	May 1
Kentucky Rock Asphalt pfd. (qu.)	1.75,	June 1
Lehigh P. C. pfd. (qu.)	1.75,	July 1
Superior P. C. Cl. A (mo.)	0.27½,	June 1
U. S. Gypsum com. (qu.)	0.40,	June 30
U. S. Gypsum pfd. (qu.)	1.75,	June 30

SUMMARY OF PROFIT AND LOSS BY QUARTERLY PERIODS OF THE NEW ENGLAND LIME CO.

(From December 1, 1929, to February 28, 1931)

Particulars	Quarterly periods ended— February 28, 1930	May 31, 1930	August 31, 1930	November 30, 1930	Fiscal year ended November 30, 1930	Quarter ended February 28, 1931	‡Six months ended February 28, 1931
Net sales	$141,855.65	$257,259.64	$230,688.40	$194,896.70	$824,700.39	$133,011.02	$327,907.72
Cost of goods sold	119,336.14	199,363.53	169,054.92	139,726.82	627,481.41	90,634.01	230,360.83
Gross profit on sales	$22,519.51	$57,896.11	$61,633.48	$55,169.88	$197,218.98	$42,377.01	$97,546.89
Deduct: Selling and administrative expense	61,140.88	68,925.81	68,580.60	47,656.11	246,303.40	38,652.33	86,308.44
Net profit or loss from operations	*$38,621.37	*$11,029.70	*$6,947.12	*$7,513.77	*$49,084.42	$3,724.68	$11,238.45
Other income or expense	4,982.14	3,879.73	6,192.42	4,650.41	19,704.70	*3,772.90	877.51
Income available for interest	*$33,639.23	*$7,149.97	*$754.70	$12,164.18	*$29,379.72	*$48.22	$12,115.96
Interest on funded debt	18,000.00	18,000.00	18,000.00	18,000.00	72,000.00	18,000.00	36,000.00
Net loss before deductions for non-cash items	$51,639.23	$25,149.97	$18,754.70	$5,835.82	$101,379.72	$18,048.22	$23,884.04
Deduct: †Non-cash items	34,960.90	35,386.51	35,291.41	35,152.30	140,791.12	35,186.01	70,338.31
Net loss	$86,600.13	$60,536.48	$54,046.11	$40,988.12	$242,170.84	$53,234.23	$94,222.35

*Loss. †Includes provisions for depreciation and depletion and amortization of bond discount. ‡Six months ended February 28, 1931, covers operations of the company during existence of Bondholders' Protective Committee.

Coplay Cement Annual Statement

THE Coplay Cement Manufacturing Co., Coplay, Penn., reports for the year ended December 31, 1930:

CONSOLIDATED INCOME ACCOUNT

	1930	1929
Sales	$1,955,987	$2,089,595
Cost of sales	1,740,148	1,913,567
Depreciation and depletion	241,591	237,298
Operating loss	25,842	61,270
Interest	22,779	23,712
Deferred charges, adjustments, etc.	56,402	77,686
Net loss	$ 105,024	$ 162,668

CONSOLIDATED BALANCE SHEET

ASSETS

	1930	1929
*Lands, plants, etc.	$3,534,951	$3,761,277
Investments, etc.	72,933	54,177
Current assets:		
Inventories	365,567	438,179
Cash	190,426	50,253
Bills and accounts receivable	155,744	183,713
Deferred charges	93,594	81,701
Total	$4,413,215	$4,569,300

LIABILITIES

Preferred stock	$ 984,400	$ 984,400
Common stock	2,000,000	2,000,000
Bonded debt	373,700	382,900
Current liabilities:		
Accounts payable and accruals	52,777	94,638
Reserves	50,000	50,000
Surplus	952,338	1,057,362
Total	$4,413,215	$4,569,300
Current assets	$ 711,738	$ 672,145
Current liabilities	52,778	94,638
Working capital	$ 658,960	$ 577,507

*Less depreciation and depletion; 1930, $2,132,343; 1929, $1,891,300.

Great Lakes Portland Cement Co. Annual Statement

THE ANNUAL income account and balance sheet of the Great Lakes Portland Cement Co., Buffalo, N. Y., for the year ended December 31, 1930, is reported as follows:

INCOME ACCOUNT

Sales	$2,350,510
Cost of sales	1,581,456
Depreciation	280,351
Taxes	81,293
Net earnings	407,409
Other income	5,224
Total income	412,633
Interest	19,869
Net income	392,764
Federal taxes	32,059
Balance	360,705
Dividends	315,000
Surplus	$ 45,705

BALANCE SHEET

ASSETS

Property account	$5,266,210
Current assets:	
Marketable securities	38,740
Cash	9,203
Inventories	656,378
Notes receivable	575
Accounts receivable	38,645
Deferred charges	27,013
Total	$6,036,764

LIABILITIES

Capital stock	$4,500,000
Current liabilities:	
Notes payable	350,900
Accounts payable	92,984
Tax reserve	32,759
Dividends payable	78,750
Other current liabilities	3,350
Depreciation reserve	699,325
Other reserves	29,967
Surplus	248,730
Total	$6,036,764
Current assets	$ 743,541
Current liabilities	558,743
Working capital	$ 184,798

Construction Materials Corp. Bond Issue

A BANKING GROUP headed by the Union Cleveland Corp., the Cleveland Trust Co., A. G. Becker and Co., the Guardian Trust Co. and Midland Corp., Cleveland, Ohio, is offering $1,500,000 in two-year 6% notes at 99½ and interest, to yield over 6.25%, of the Construction Materials Corp., Chicago, Ill.

The offering represents the second and final part of the financing plan the corporation is undertaking for expansion purposes. The initial financing comprised an issue of $1,650,000 first mortgage marine equipment 6% sinking fund bonds of the Sensibar Transportation Co., a wholly-owned subsidiary.

Dated March 15, 1931,; due March 15, 1933; principal and interest are payable at the main office of Cleveland Trust Co., Cleveland, Ohio, trustee. Interest is payable semi-annually.

The bonds are redeemable at any time upon 60 days notice or on any interest date upon 30 days' notice at 102 prior to September 15, 1931; thereafter and prior to March 15, 1932, at 101½; thereafter and prior to September 15, 1932, at 101; thereafter and prior to maturity at 100½ plus accrued interest in each case. The corporation agrees to refund to resident holders upon timely application the Pennsylvania 4 mill tax and the Kentucky 5 mill tax. Interest is payable without deduction for federal income taxes not exceeding 2%.

CAPITALIZATION UPON COMPLETION OF PRESENT FINANCING

Two-year 6% notes (this issue)	$1,500,000
Purchase money mortgage	225,000
Cumulative convertible preferred stock (no par value): (declared value $45 per share, 75,000 shares outstanding)	3,375,000
Common stock (no par value), declared value $5 per share (shares authorized, 300,000; shares outstanding, 185,000)	925,000

Note.—Company is guarantor of $1,650,000 bonds of Sensibar Transportation Co.

History and Business. The corporation was organized in Delaware in 1929, taking over the business of Construction Materials Co. of Indiana, successor to a business founded in 1906, and the R. F. Conway Co., successor to a business founded in 1871. Corporation engages in the following activities: (1) Supplying the building and paving industries with sand and gravel from its plant at Ferrysburg, Mich.; (2) reclaiming low lying or submerged water front properties through the sand fill method; (3) street paving and road building through its wholly owned subsidiary, the R. F. Conway Co.; (4) operation of a fleet of self-loading and self-unloading vessels transporting these materials.

Purpose. Proceeds of this issue and $1,650,000 bonds of Sensibar Transportation Co. are to be used to retire indebtedness already incurred for new plant and marine equipment, to complete the Ferrysburg plant and for additional working capital.

Assets. Based on consolidated balance sheet as of December 31, 1930, and adjusted to give effect to this financing, the corporation had as of that date net tangible assets applicable to these notes, after deduction of all other liabilities of $7,390,511 and net current assets of $1,385,000.

Earnings. Consolidated earnings of corporation and its subsidiaries available for interest were as follows:

	Available for interest	Interest on subsidiary company bonds	Balance
1927	$716,977	$112,500	$604,477
1928	1,080,620	112,500	968,120
1929	988,830	112,500	876,330
1930	483,378	112,500	370,878
Annual average	817,451	112,500	704,951

Pro forma consolidated balance sheet, as of December 31, 1930 (giving effect to new financing, organization of Sensibar Transportation Co., etc.):

ASSETS

Property and equipment, less depreciation	$3,333,609
Vessels	246,248
Sand and gravel deposits	783,815
Good-will	1
Investments in affiliated companies	1,713,391
Current assets:	
Cash	721,296
Accounts receivable	455,729
Note receivable (secured)	526,695
Retainer certificates	106,769
Inventories	137,541
Cash value, life insurance	29,680
Miscellaneous accounts receivable	303,448
Deferred charges	102,809
Total	$8,461,031
Liabilities:	
*Preference stock	$3,375,000
†Common stock	925,000
Funded debt	1,500,000
Purchase money mortgage	225,000
Current liabilities:	
Accounts payable	462,360
Accruals	130,350
Reserve for contingencies	150,000
Surplus	1,693,321
Total	$8,461,031
Current assets	$1,977,710
Current liabilities	592,710
Working capital	$1,385,000

*Represented by 75,000,000 preference shares.
†Represented by 185,000 no par shares.

Sensibar Transportation Co. Bonds

An issue of $1,650,000 first mortgage marine equipment 6% sinking fund bonds is being offered at 99 and interest by Union Cleveland Corp. and Cleveland Trust Co., Cleveland, Ohio.

Dated March 15, 1931; due March 15, 1943. Unconditionally guaranteed by Construction Materials Corp. as to principal, interest and sinking fund. Principal and interest payable at the main office of the Union Trust Co., Cleveland, Ohio, trustee. Interest payable monthly and semi-annually without deductions for normal federal income tax not exceeding 2%. Denominations $1000 and $500. The company will agree to refund Michigan 5 mill secured debt tax, Pennsylvania 4 mill tax and Kentucky 5 mill tax to resident holders upon timely application. Redeemable all or part by lot on any interest date upon 30 days' prior notice at 104 up to and including March 15, 1934, at 103 up to and including March 15, 1937, at 102 up to and including March 15, 1940, and thereafter and prior to maturity at 101, plus interest in each case.

Company. A Delaware corporation, is a wholly owner subsidiary of Construction Materials Corp. The company owns the vessels *J. R. Sensibar, Sandmaster* and *Sandcraft,* which it has leased to Construction Materials Corp. for a period equal to the life of these bonds at annual rental sufficient to meet the interest and sinking fund charges in each year.

Operating Company. Construction Materials Corp. is the largest producer of sand and gravel on the Great Lakes and is also engaged in the transportation of these materials for building and construction, road building, street paving, water-front improvement and harbor developments.

Security. The bonds will be secured by a first preferred vessel mortgage upon the three vessels: *J. R. Sensibar,* appraised at $1,868,608; *Sandmaster,* appraised at $658,000; *Sandcraft,* appraised at $481,000.

Operations. Construction Materials Corp., the lessee, uses these vessels to transport sand and gravel from its plant near Grand Haven, Mich., to its principal markets on the Great Lakes, for channel deepening and for reclaiming low lying or submerged water front properties through the sand fill method. They are able to load and unload sand and gravel with their hydraulic equipment where close approach to the shore is impossible.

Earnings. Consolidated earnings of Construction Materials Corp. and its subsidiaries available for interest, as reported by Ernst and Ernst, were as follows: 1927, $716,977; 1928, $1,080,620; 1929, $988,830; 1930, $483,378. The annual average was $817,451.

Average annual consolidated earnings as shown above amount to 7.26 times the maximum interest requirements of this company for the four-year period and 4.29 times for 1930. Including the parent company debt, consisting of $1,500,000 two-year 6% notes, and $225,000 purchase money mortgage and subsidiary funded debt, average consolidated earnings amount to 3.78 times the total interest requirements and 2.23 times for 1930.

Sinking Fund. Mortgage will provide for a minimum annual sinking fund, sufficient in amount to retire all bonds by maturity. The annual amounts to be retired, beginning with $120,000 on March 15, 1934, gradually increase so that there are to be retired $210,000 principal amount of bonds in 1942. To provide funds for the minimum sinking fund to be used in the retirement of bonds by purchase or redemption, and to provide funds for the purchase of bonds at or below par to the extent that the moneys paid exceed the requirements for the minimum sinking fund, the company will make quarterly payments to the trustee, beginning May 25, 1933, equal to 4c per ton of cargo carried on the mortgaged vessels for the preceding quarter year, and to the extent that they exceed the minimum sinking fund requirements, such payments will be used in the purchase of bonds for retirement, if obtainable at or below par, otherwise such excess amounts will revert to the company.

APPROXIMATE CONSUMPTION OF LIMING MATERIALS ON UNITED STATES FARMS DURING 1929

(Compiled by National Lime Association)
(Ton Basis)

STATE	Ground limestone	Limestone screenings	Burned lime	Hydrated lime	Miscellaneous materials*	Total liming materials	Effective lime oxides†	Pounds of lime oxides per acre of crop land
Maine	1,500	.....	.....	308	6,535	8,343	4,233	5.1
New Hampshire (§)	5,000	.....	.....	500	.....	5,500	2,850	10.5
Vermont	7,101	.....	.....	1,500	.....	8,601	4,600	8.0
Massachusetts (§)	30,315	.....	.....	18,034	7,987	56,336	31,774	93.0
Rhode Island (§)	381	.....	.....	825	70	1,276	803	21.1
Connecticut (§)	25,000	.....	.....	2,500	.....	27,500	14,250	53.4
NEW ENGLAND	69,297	.....	.....	23,667	14,592	107,556	58,510	25.6
New York	158,545	.....	2,035	24,420	.....	185,000	98,096	21.6
New Jersey	10,674	.....	1,322	35,079	1,261	48,336	31,647	56.2
Pennsylvania	139,654	.....	25,632	80,523	9,369	255,178	152,664	36.2
Delaware	650	240	5,610	10,640	30	17,170	12,641	48.7
Maryland	2,521	522	7,312	16,937	1,554	28,848	20,291	18.2
West Virginia	10,000	.....	568	2,180	682	13,430	7,350	7.7
MID-ATLANTIC	322,044	762	42,479	169,779	12,896	547,962	322,689	27.7
Ohio	198,504	.....	.....	26,683	12,194	237,381	124,027	21.3
Indiana	184,996	.....	.....	10,649	8,487	204,132	104,196	17.4
Illinois	.....	950,000	.....	.....	.....	950,000	332,500	31.2
Kentucky	270,000	.....	10,000	.....	26,000	306,000	156,500	45.8
Michigan	35,273	66,141	.....	9,688	.....	111,102	47,567	9.8
Minnesota	11,700	3,560	.....	.....	2,680	17,940	8,436	0.9
Iowa	.....	350,000	.....	.....	.....	350,000	122,500	11.1
Kansas	41,250	2,100	.....	25	.....	43,375	21,378	1.8
Missouri	236,897	.....	.....	.....	.....	236,897	118,448	15.5
MID-WESTERN	978,620	1,371,801	10,000	47,045	49,361	2,456,827	1,035,552	14.6
Virginia	75,000	10,000	25,000	10,000	.....	120,000	69,250	25.8
North Carolina	100,000	.....	.....	.....	.....	100,000	50,000	14.6
Florida	3,000	.....	1,000	3,000	.....	7,000	4,450	4.4
Mississippi (§)	8,000	.....	.....	2,000	.....	10,000	5,400	1.6
Tennessee	350,000(‡)	.....	.....	.....	.....	350,000	175,000	46.1
SOUTHEASTERN	536,000	10,000	26,000	15,000	.....	587,000	304,100	21.3
California	6,502	.....	.....	1,399	23,121	31,022	15,791	2.6
Oregon (§)	2,000	.....	.....	.....	.....	2,000	1,000	0.5
Washington	4,000	.....	.....	.....	.....	4,000	2,000	0.7
WESTERN	12,502	.....	.....	1,399	23,121	37,022	18,791	2.0
GRAND TOTALS	1,918,463	1,382,563	78,479	256,890	99,970	3,736,367	1,739,642	....

States not listed have no figures available or consume little or no liming material.
*Consisting of ground shells, byproduct lime, marl, etc.
†"Effective lime oxides" are computed on the basis of 35% for limestone screenings; 50% for ground limestone and miscellaneous materials; 70% for hydrated lime; 85% for burned lime.
‡Unclassified, but mostly ground limestone.
§1930 tonnages—all other states, 1929.

George S. Bartlett Appreciation

AT ST. LOUIS RECENTLY a group of George Bartlett's friends decided to establish a medal to perpetuate the friendliness and helpfulness which he has brought into his work in the highway field. The medal is to be awarded annually to an engineer, highway official, contractor or manufacturer who has made a notable contribution to the highway art or the highway industry. The leading highway associations are to be asked to act as custodians of the fund and to make the annual award. Contributions to complete this fund are being collected.

Among those active in the portland cement industry who are on the medal committee are B. F. Affleck, Adam L. Beck, H. L. Block, J. B. John, Frederick W. Kelly, Morris Kind, William M. Kinney, W. W. Lober, W. S. Mallory, Blaine S. Smith, Frank H. Smith, H. Struckmann, L. T. Sunderland, C. E. Ulrickson and George E. Warren. Highway officials, machinery manufacturers and other organizations interested in and benefited by highway construction are represented on the committee.

Manufacturer Celebrates Fiftieth Anniversary

FIFTY YEARS ago some enterprising men opened a modest plant at Buda, Ill., to manufacture railroad supplies. Ten years later progress of this venture made it desirable to move to Harvey, Ill. This year marks 50 years of operation.

Today this company, the Buda Co., employs approximately 1500 people and manufactures products used in many industries. Its record of growth and continued stability is of particular interest in a time that demands strength and courage in carrying on to achieve even greater accomplishment.

Silas T. Wilson

SILAS T. WILSON, 31, vice-president and general manager of the Lexington Concrete Products Co., Lexington, Ky., and chief engineer and director of the Central Rock Co., Lexington, Ky., died April 30, at Frankfort, Ky., after a brief illness.

He was a graduate engineer of the University of Kentucky in 1922, and was formerly city engineer of Frankfort.

Axel G. Swanson

AXEL G. SWANSON, 53, president of the Omaha Concrete Stone Co., Omaha, Neb., and the Forsell Oil Co., died April 26.

Born in Sweden, he came to Omaha 50 years ago. He has served as president of the Nebraska Concrete Products Association and as secretary-treasurer of the National Concrete Products Association.—*Omaha* (Neb.) *World-Herald.*

Traffic and Transportation

Car Loadings of Sand and Gravel, Stone and Limestone Flux

THE following are the weekly loadings of sand and gravel, crushed stone and limestone flux (by railroad districts) as reported by the Car Service Division, American Railway Association, Washington, D. C.:

CAR LOADINGS OF SAND, GRAVEL, STONE AND LIMESTONE FLUX

District	Limestone Flux Week ended Apr. 18	Limestone Flux Week ended Apr. 25	Sand, Stone and Gravel Week ended Apr. 18	Sand, Stone and Gravel Week ended Apr. 25
Eastern	2,050	2,041	4,211	5,010
Allegheny	1,897	1,904	3,850	4,330
Pocahontas	526	521	1,088	1,199
Southern	824	825	8,686	9,154
Northwestern	748	896	3,103	3,650
Central Western	358	318	7,240	7,471
Southwestern	141	161	6,266	5,688
Total	6,544	6,666	34,444	36,502

COMPARATIVE TOTAL LOADINGS, BY DISTRICTS, 1930 AND 1931

District	Limestone Flux 1930 Period to date Apr. 26	Limestone Flux 1931 Period to date Apr. 25	Sand, Stone and Gravel 1930 Period to date Apr. 26	Sand, Stone and Gravel 1931 Period to date Apr. 25
Eastern	39,115	23,776	51,931	28,406
Allegheny	39,466	26,224	56,136	31,961
Pocahontas	4,497	3,004	12,489	10,196
Southern	10,973	9,937	111,098	104,401
Northwestern	10,805	7,783	29,164	21,927
Central Western	8,014	6,569	112,383	66,976
Southwestern	6,305	3,813	84,358	65,118
Total	119,175	81,106	457,559	328,985

COMPARATIVE TOTAL LOADINGS, 1930 AND 1931

	1930	1931
Limestone flux	***119,175***	***81,106***
Sand, stone, gravel	***457,559***	***328,985***

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week of May 16:

NEW ENGLAND FREIGHT ASSOCIATION DOCKET

22587. **Common sand** and **screened** or **crushed gravel**, minimum weight 50 tons of 2000 lb. (100,000 lb.), from Manchester, N. H., to Baileys, N. H. Present rate, 10c; proposed, 60c per net ton. Reason—To meet motor truck competition.

22611. **Common sand** and **screened** or **crushed gravel**, minimum weight 50 tons of 2000 lb. (100,000 lb.), from East Weare, N. H., to Baileys, N. H. Present rate, 12½c; proposed, 70c per net ton. Reason—To meet motor truck competition.

22614. **Sand, core, fire** or **sea** (See Note 2), from Provincetown, Mass., to Waltham, Mass. Present rate, 12½c; proposed, 11c. Reason—To establish a rate comparable with that in effect from Provincetown, Mass., to Portland, Me.

22669. **Common sand** and **gravel**, minimum weight 50 net tons of 2000 lb., from Scarboro Beach, Me., to Westbrook, Me. Present rates, 60c per net ton on common sand, run of bank gravel, 70c per net ton on screened and crushed gravel; proposed, 50c. Reason—To meet motor truck competition.

22670. To cancel commodity rate of 55c per net ton on **common building sand** and **run of bank** or **screened** or **crushed gravel**, from Scotia, N. Y., to Saratoga Springs, N. Y., as published in B. & M. R. R., P. S. C.-N. Y. No. 962, and apply in lieu thereof the commodity rates of 62c per net ton on common sand and run of bank gravel, and 70c per net ton on screened or crushed gravel, minimum weight 50 net tons, published in B. & M. R. R. P. S. C.-N. Y. No. 1017, from Scotia, N. Y., to all B. & M. R. R. deliveries at Saratoga Springs, N. Y. Reason—To cancel an obsolete commodity rate.

TRUNK LINE ASSOCIATION DOCKET

26803. **Crushed stone**, carloads (See Note 2), from White Haven, Penn., to Meshoppen, Penn., $1 per net ton. Present rate, $1.15. (See Note 4.)

26822. **Limestone**, viz., **crude, fluxing, foundry and furnace**, when shipped in open-top equipment, carloads (See Note 2), from Ashcom, Hamers Mill to Belfast Colliery, inclusive, Burnham to Lewiston, inclusive, and Pleasant Gap, Penn., to Portsmouth, O., $3.02 per gross ton. Present rate, 19½c per 100 lb. Reason—Proposed rate is comparable with rate from Martinsburg, W. Va.

26824. **Sand, common or building** (not blast, engine, fire, foundry, glass, molding or silica sand) and **gravel**, carloads (See Note 2), from Boonville and Alder Creek, N. Y., to Clinton, Franklin Springs, Deansboro, Oriskany Falls, Solsville and Bouckville, N. Y., $1.10 per net ton. Reason—Proposed rates are comparable with rates on like commodities from and to points in the same general territory.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will app'y.

Note 4—Reason—Proposed rates are comparable with rates on like commodities for like distances, services and conditions.

26430. **Slag, blast, furnace, crushed**, in bulk, carloads (See Note 2), from Buffalo, N. Y., to Smethport, Penn., Bingham and Backus, Penn., $1.10 per net ton, and from Le Roy, N. Y., to Bingham, Backus and Taintors, Penn., $1.10 per net ton; also to establish rate on **sand and gravel**, carloads (See Note 2), from Springville and Machias, N. Y., to Taintors, Penn., $1 per net ton, and to Bingham and Backus, Penn., 90c per net ton.

26839. **Sand, blast, engine, glass, quartz, silica or silex**, carloads (See Note 2), from Tatesville, Penn., and Mapleton District, Penn., to Knox, Marienville, Penn., $2.10, and Parkers Landing, Penn., $1.95 per net ton. Reason—Proposed rates are comparable with rates from Berkeley Springs District.

26847. **Ground limestone**, carloads, minimum weight 50,000 lb., from Bellefonte and Pleasant Gap, Penn., to Shinnston and Monongah, W. Va., 10½c per 100 lb. Present rate, 25½c, sixth class. Reason—Proposed rate is comparable with rates from Martinsburg, W. Va., Thomasville, Penn., etc.

26426. (a) **Building lime**, carloads, minimum weight, 30,000 lb.; (b) **agricultural, land, chemical, gas or glass lime**, carloads, minimum weight 30,000 lb., and **ground limestone**, carloads, minimum weight 50,000 lb., from Pinola, Penn., Security, Marl, Charlton, Md., Bricklyn, Hanover, Penn., Cavetown, Hagerstown, Pinesburg, Md., Thomasville, York and Bitinger, Penn., to Alton to Liverpool, N. Y., inclusive, (a) 17c and (b) 16c per 100 lb.

26745. **Stone, natural** (other than bituminous asphalt rock), **crushed**, carloads (See Note 2), from Oaks Corners, N. Y., to Horseheads, N. Y., $1.10 per net ton.

26858. (a) **Building lime**, carloads, minimum weight 30,000 lb.; **(b) lime, agricultural, chemical and land**, carloads, minimum weight 30,000 lb.; also **unburnt, ground or pulverized limestone**, carloads, minimum weight 50,000 lb., from Grove, Frederick, Keller, Buckeystown, Md., Engle, Martinsburg, Millville, Natural Lime-Marl Co.'s Siding, Charlestown, Alba Marl Lime Co., W. Va., Stephens City, Vaucluse, Cedar Creek, Oranda, Capon Road, Strasburg Jct. and Strasburg, Va., to Harrisburg, Penn., (a) 9½c and (b) 9c per 100 lb. Reason—Proposed rates are comparable with rates to Gettysburg, Penn.

26873. **Sand** (blast, engine, fire, foundry, glass, molding or silica), carloads (See Note 2), from Slatington, Penn., to Bethlehem, Catasauqua, Nazareth and Tamaqua, Penn., 90c per net ton. Reason—Proposed rate is comparable with rate from Palmerton, Penn., to Easton, Penn., and from Germans, Penn., to East Bangor, Penn.

26874. (a) **Lime, building**, carloads, minimum weight 30,000 lb.; (b) **lime, agricultural, chemical, land, gas or glass**, carloads, minimum weight 30,000 lb., and **limestone, ground**, carloads, minimum weight 50,000 lb., from Annville, Brownstone, Hummelstown, Lebanon, Myerstown, Palmyra and Swatara, Penn., to L. V. R. R. points, Beaver Brook, McAdoo, Morea Colliery, Ashland, Bear Creek and various, (a) 14c and (b) 13c per 100 lb. Reason—Proposed rates are comparable with rates from Bainbridge, Penn.

M-1755. *(a) **Stone, natural** (other than bituminous asphalt rock), **crushed**, carloads; †(b) **sand, common or building** (not blast, engine, fire, foundry, glass, molding or silica sand), and **gravel**, carloads. Carload minimum weights: Crushed stone in ordinary equipment (See Note 3); crushed stone, sand and gravel, in steel shipping containers, 110,000 lb., from Marlboro, N. Y., to Milton, Highland (West Park), Esopus, Ulster Park, Port Ewen and Kingston, N. Y., (a) ‡proposed, 60c; Lake Katrine and Mt. Marion, (a) ‡proposed, 70c; from Newburgh, N. Y., to Kingston and Mt. Marion, (b) ‡proposed, 70c per net ton. Reason—To meet water competition.

*In ordinary freight car equipment and in steel shipping containers loaded on container cars.

†In steel shipping containers loaded on container cars.

‡To include transfer of load from cars at destination.

M-1757. **Crushed stone**, carloads (See Note 2), from Cavetown, Md., to Five Forks, Penn., 60c per net ton, and from Waynesboro, Penn., to Chambersburg, Penn., 60c per net ton. Reason—To meet motor truck competition.

26473. **Stone chips** or **granules**, carloads, minimum weight 50,000 lb., from Advance and Gladhill, Penn., to Beloit, Janesville and Madison, Wis., $5.20 per net ton.

25161. **Stone chips** or **granules**, carloads, minimum weight 50,000 lb., from Advance and Gladhill, Penn., to Superior Wis., $6.90 per net ton.

26885. Cancel commodity rates on **limestone, ground, precipitated, pulverized, granulated, glasshouse and agricultural limestone**, carloads, from Atlas and Hamburg, N. J., to points in Trunk Line and New England territories. Reason—Investigation develops no traffic has moved for some time, nor is there prospects for future shipments, therefore rates are obsolete.

26888. **Crushed stone**, carloads; **crushed stone, coated with oil, tar** or **asphaltum**, carloads; **sand** and **gravel**, other than blast, engine, foundry, glass, molding or silica (See Note 2), from Hornell, N. Y., to Erie R. R. stations, Adrian, Cohocton, Geneseo, Le Roy, Rochester, Arkport, Warsaw, N. Y., Susquehanna, Penn., Binghamton, Elmira, Watkins Glen, N. Y., Tioga, Morris, Penn., Horseheads, Attica, Buffalo, Suspension Bridge, Belmont, Allegany, Bradford, Johnsonburg, Salamanca, N. Y., and various, rates ranging from 60c to $1.30 per net ton. (See Note 4.)

M-1761. **Crushed stone**, carloads (See Note 2), from Grove and Fredericks, Md., to Morgan, Md., 70c per net ton. Present rate, 75c.

M-1762. **Crushed stone**, carloads (See Note 2), from Union Furnace, Penn., to Huntington, Penn., 50c per net ton. To expire November 30, 1931. Present rate, 60c. Reason—To meet motor truck competition.

M-1763. To establish from Mahwah, N. J., to stations on Erie R. R., rates on **paving composition** made of **crushed stone, sand, powdered limestone, powdered asphalt** and **oil** (ingredients other than crushed stone and sand not to exceed 8% of the total), carloads (See Note 2), on basis of 10c over the current rates on crushed stone.

26159. **Sand, blast, engine, foundry, silica, quartz** or **silex**, carloads (See Note 2), from Mapleton district to Sheffield, Penn., $2.25 per net ton.

26420. (a) **Building lime**, carloads, minimum weight 30,000 lb.; (b) **agricultural, land, chemical, gas** or **glass lime**, carloads, minimum weight 30,000 lb., and **ground limestone**, carloads, minimum weight 50,000 lb., from Knickerbocker, Howellville, Rambo, Plymouth Meeting, Blue Bell, Devault, Temple, Billmyer, Littlestown, Penn., Union Bridge to Frederick, Md., Union Stone Co., Bainbridge, Rheems, Penn., Baltimore stations,

Texas, Cockeysville, Md., York stations, Spring Grove, Hanover, Penn., Falling Waters, Berkeley, Martinsburg and Bunker Hill, W. Va., to Alton to Liverpool, N. Y., inclusive, (a) 17c and (b) 16c per 100 lb.

26924. **Sand (blast, core, engine, fire, foundry, glass, molding, quartz, silex or silica)**, in straight or mixed carloads (See Note 2), from Foxburg and Emlenton, Penn., to Marienville, Penn., $1.26 per net ton. Reason—Proposed rate is comparable with rates on like commodities from and to points in the same general territory.

26927. To amend description on **sand**, from South Jersey points to Trunk Line territory, to read as follows:

(A) Sand (other than sand processed beyond washing or screening for decolorizing, filtering or water softening), in open-top equipment, carloads.

(B) Sand (other than sand processed beyond washing or screening for decolorizing, filtering or water softening), in box cars or other closed equipment, carloads.

Present description now reads:

(A) Sand (other than blast, engine, glass, silica, silex, quartz, molding or foundry sand) and gravel.

(B) Sand, blast, engine, glass, silica, silex, quartz, molding or foundry.

Reason—To clarify tariff.

26928. **Crushed stone**, carloads (See Note 2), from Port Richmond (Philadelphia), Penn., to Atco, N. J., 75c per net ton. Present rate, 85c. (See Note 4.)

26929. **Asbestos sand, asbestos gravel**, in bags or in bulk, carloads, minimum weight 60,000 lb., from Danville, Warwick and Sherbrooke, Que., to New York, N. Y., lighterage delivery, 26½c per 100 lb.

26932. To cancel switching charge on **sand**, carloads, from Delaware, N. J., in connection with the N. Y. S. & W. R. R. at Delaware, N. J., as covered by D. L. & W. R. R. Tariff I. C. C. 21801. Reason—N. Y. S. & W. R. R. have abandoned their Delaware, N. J., station and track connection with rails of D. L. & W. R. R. has been removed, therefore switching charge is obsolete.

26933. **Sand** and **gravel**, other than blast, engine, foundry, glass, molding or silica, carloads (See Note 2), from Alfred, N. Y., to Horseheads and Breesport, N. Y., $1.20 per net ton. Present rate, 16c per 100 lb.) (See Note 4.)

M-1770. **Sand** (other than blast, engine, foundry, glass, molding, quartz, silica or silex) and **gravel**, carloads (See Note 2), from Haven, N. Y., to Port Jervis, N. Y., 40c per net ton. Rate to expire December 31, 1931. Present rate 60c.

CENTRAL FREIGHT ASSOCIATION DOCKET

28427. To establish on **stone, crushed** (in bulk), **crushed stone screenings** (in bulk), **agricultural limestone** (not ground or pulverized, in bulk, in open-top cars), and **agricultural limestone screenings**, carloads (See Note 3), from Bellevue, O., to Braceville and Phalanx, O., rate of 90c per net ton. Present rate, 17c.

28432. To establish on **limestone, agricultural, unburnt**, in bulk, in open-top cars; **stone, crushed**, in bulk, in open-top cars, and **stone screenings**, in bulk, in open-top cars, in straight or mixed carloads (See Note 3). Rates in cents per net ton:

To	From Gibsonburg, O. Prop.	Pres.	From Woodville, O. Prop.	Pres.
Kalamazoo, Mich.	145	155	145	155
Schultz, Mich.	155	*	155	*
Woodbury, Mich.	165	*	165	*

*Classification basis.

28434. To establish on **sand and gravel**, carloads (See Note 3), from Columbus, O., to Mt. Sterling, Era and Derby, O., rate of 65c per net ton. Route—Via B. & O. R. R. direct. Present rate, 170c.

28435. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and **gravel**, carloads (See Note 3), from Hugo, O., to Augusta, Watheys and Mechanicstown, O., on the N. Y. C. R. R., rate of 80c per net ton. Present rate, 90c.

28436. To establish on **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) and **gravel**, carloads (See Note 3), from Hugo, O., to Kinsman, O., rate of 95c per ton of 2000 lb. Present rate, 100c.

28437. To establish on **fluxing stone**, carloads (See Note 3), from Fultonham and White Cottage, O. Rates in cents per ton of 2240 lb.:

To	Pres.	Prop.
Ashland, Ky.	360	112
Ironton, O.	139	101
Portsmouth, O.	139	101

28445. To establish on **crushed stone** (in bulk), **crushed stone screenings** (in bulk), **agricultural limestone** (not ground or pulverized, in bulk, in open-top cars), from Sandusky, O., to Ceylon and Vermillion, O., rate of 50c per ton of 2000 lb. Present rate, 60c.

28446. To establish on **sand**, viz., blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica, carloads, in open-top cars, from James Siding and Jones Siding, Penn. Rates in cents per net ton.

To points in Penn.	Pres.	Prop.	To points in Penn.	Pres.	Prop.
Aliquippa	151	120	Meadville	126	90
Beaver Falls	151	120	Monessen	227	140
Braddock	180	130	Monaca	151	120
Butler	139	120	New Castle	139	110
Corry	126	110	Oil City	88	60
Ellwood City	139	120	Pittsburgh	176	130
Erie	140	110	Sharon	139	100
Franklin	88	60	Sharpsville	139	100
Greenville	113	100	Washington	176	160
Grove City	126	110	West Newton and to	227	140
Homestead	180	130	Youngst'n, O.	139	100
McKees Rocks	176	130			

28454. To establish on **crushed stone**, carloads, from Melvin, O., to Greenfield, Bainbridge, Waverly and Jackson, O., rate of 80c per net ton. Present rates, 90c to Greenfield, Bainbridge and Waverly, and 15c per 100 lb. (6th class) to Jackson, O. Route—Via Washington C. H., O., and D. T. & I. R. R.

28462. To establish on **crushed stone**, carloads, from Greencastle, Ind., to Loogootie and Shoals, Ind., rate of 100c per net ton. Present rate, 110c.

28463. To establish on **agricultural limestone, unburned**, in open-top cars; **stone, crushed**, in bulk, in open-top cars, and **stone screenings**, in bulk, in open-top cars, carloads, rates in cents per net ton, to B. & O. R. R. stations in Ohio:

To	From Maple Cliff, O. Pres.	Prop.	From W. Columbus, O. Pres.	Prop.
Mt. Sterling	80	70	80	70
Cooks	80	70	80	70
Madison Mills	80	75	80	75

28467. To establish on **core sand**, carloads, from Juniata, McHale, Wampson, Sargent and Vassar, Mich., to Ionia, Greenville and Grand Rapids, Mich., rate of 139c per net ton. Present rate, 151c.

28472. To establish on **crushed stone**, carloads, from North Baltimore, O., to Aukerman, O., rate of 80c per net ton. Route—Via B. & O. R. R. direct. Present rate, 90c.

28475. To establish on **sand**, viz., **lake, river** and **bank**, other than sand loam, carloads, from Gary, Calumet, Willow Creek, Ind., to Lafayette, Ind., rate of 126c per net ton. Route—Wabash Ry., New Paris, Ind., Winona R. R., Peru, Ind., and Wabash Ry. Present rate, 139c.

28482. To establish on **sand** and **gravel**, from Chillicothe and Rittenours, O. (rates in cents per net ton):

To	Prop.
Jeffersonville, O.	80
Sedalia, O.	90

Present rate, $1.10 from Chillicothe, O., to Jeffersonville and Sedalia, O., classification basis. Route—Via B. & O. R. R., Washington C. H., O., and D. T. & I. R. R.

28483. To establish on **crushed stone**, carloads, from Sandusky, O., to points in Ohio (rates in cents per net ton):

To	Prop.	Pres.	To	Prop.	Pres.
Newport	125	150	Martins Ferry	145	*
Stillwater	125	150	Bellaire	145	150
Freeport	135	150	Cambridge	135	150
Bannock	135	150	Lore City	145	150
Fairpoint	145	150	Cumberland	145	*
St. Clairsville	145	*	Barnesville	145	150
Bridgeport	145	150			

*Sixth class.

Route—Via B. & O. R. R. direct.

28491. To establish on **crushed stone**, carloads, from Sandusky, O., to Mansfield, O., rate of 60c per net ton. Route—Via B. & O. R. R. direct. Present rate, 70c.

28494. To establish on **sand**, viz., lake, river and bank, other than sand loam, carloads, from Gary and Willow Creek, Ind. Rates in cents per net ton.

To Kankakee, Ill: Route, Wabash, Chicago, Ill., I. C.; proposed rate, 126c; present, classification basis.

To Kenosha, Wis.: Route, Wabash, Chicago, Ill., C. & N. W.; proposed rate, 133c; present, classification basis.

To Lake Forest, Ill.: Route, Wabash, Chicago, Ill., C. & N. W.; proposed rate, 123c; present, classification basis.

To Waukegan, Ill.: Route, Wabash, Chicago, Ill., C. & N. W.; proposed rate, 133c; present, classification basis.

To Peru, Ill.: Route, Wabash, Chicago, Ill., C. R. I. & P.; proposed rate, 176c; present, classification basis.

To Peru, Ill.: Route, Wabash, Chicago, Ill., C. B. & Q.; proposed rate, 176c; present, classification basis.

To St. Charles, Ill.: Route, Wabash, Chicago, Ill., C. & N. W.; proposed rate, 121c; present, classification basis.

28497. To establish on **sand** and **gravel**, carloads, from Chillicothe, O., to Albany, O., rate of 80c per net ton. Present rate, 100c. Route—Via B. & O. R. R., Grosvenor, O., and N. Y. C. R. R.

28506. To establish on **agricultural limestone, unburned**, in open-top cars; **stone, crushed**, in bulk, in open-top cars, and **stone screenings**, in bulk, in open-top cars, carloads (See Note 3), from Marion, O. (rates in cents per net ton):

To	Route	Pres.	Prop.
Cambridge, O.	A	*	110
Cambridge, O.	B	*	110
Cambridge, O.	C	150	110
Marietta, O.	A	*	130
Marietta, O.	E	150	130
Marietta, O.	C	150	130

*Sixth class.

Routes

A—P. R. R. direct; B—C. & O., Columbus, B. & O.; C—C. & O., Columbus, P. R. R.; D—P. R. R., Newark, B. & O.; E—C. & O., Athens, B. & O.

28508. To establish on **sand**, viz., **blast, core, engine, filter, fire or furnace, foundry, glass, grinding** or **polishing, loam, molding** and **silica**, carloads, from Lake Ciecott, Ind., to points in Indiana, Ohio, Illinois and Louisville, Ky., rates as shown in Exhibit A attached. Present rates, as shown in Exhibit A attached.

EXHIBIT A

FROM LAKE CIECOTT, INDIANA

To	Sand rate Pres.	Prop.
Bluffton, Ind.	139	126
Cambridge City, Ind.	320	139
Decatur, Ind.	300	139
East Chicago, Ind.	320	101
Indiana Harbor, Ind.	320	101
Jeffersonville, Ind.	410	225
LaPorte, Ind.	139	101
New Albany, Ind.	410	225
Peru, Ind.	101	80
Louisville, Ky.	440	238
Columbus, Ohio	410	227
Marion, Ohio	400	227
Miamisburg, Ohio	370	151
Piqua, Ohio	340	189
Troy, Ohio	360	202
Chicago, Ill.	320	101
Decatur, Ill.	202	176
East Moline, Ill.	460	214
Edwardsville, Ill.	440	189
Litchfield, Ill.	420	189
Moline, Ill.	460	214
North Chicago, Ill.	390	139
Rockford, Ill.	420	189
Rock Island, Ill.	460	214
Springfield, Ill.	202	189

28512. To establish on **sand**, viz., **blast, core, engine, filter, fire** or **furnace, foundry, glass, grinding** or **polishing, loam, molding** or **silica**, carloads, Bells and Centreton, Ind., to Mount Vernon, Ill., rate of 200c per net ton. Present rate, 410c.

28520. To establish on **molding sand**, carloads (See Note 3), from Eau Claire, Mich., to Detroit, Mich., rate of $1.89 per net ton. Present rate, 21c (sixth class).

28522. To establish on **gravel** and **sand**, except blast, core, engine, filter, fire or furnace, foundry, glass, grinding, polishing, loam, molding or silica, carloads (rates in cents per net ton):

From Brilliant, O., to points in Pennsylvania

To	Prop.	Pres.	To	Prop.	Pres.
Beaver Road	110	100	McMurray	100	90
Boggs	110	90	Montour Jct.	120	100
Cliff Mine	110	100	Muse	100	90
Henders'nville	100	90	National	100	90
Hyland	100	90	North Star	110	90
Imperial	110	90	Scott	110	100
Library	100	100	Steubenpike	110	90
McAdams	110	90	Storage	120	100

From Steubenville, O., to points in Pennsylvania

To	Prop.	Pres.	To	Prop.	Pres.
Beaver Road	110	100	McMurray	100	90
Boggs	110	90	Montour Jct.	110	100
Cliff Mine	110	100	Muse	100	90
Henders'nville	100	90	National	100	90
Hyland	100	90	North Star	110	90
Imperial	110	90	Scott	110	100
Library	100	100	Steubenpike	110	90
McAdams	100	90	Storage	110	100

Route—P. R. R., Hills, Penn., and Montour R. R.

28523. To establish on (a) **sand** (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding and silica) **and gravel**, carloads, from Kenneth and Lake Ciecott, Ind., to Cole, Ind., and (b) **agricultural limestone, unburned**, in bulk, in open-top cars; **crushed stone**, in bulk, in open-top cars, and **stone screenings**, in bulk, in open-top cars, carloads, from Kenneth, Ind., to Cole, Ind., rate of 60c per net ton, rate to expire December 31, 1931. Present rate, 77c. Route—P. R. R. direct.

TRANSCONTINENTAL FREIGHT BUREAU DOCKET

12404 (Cancels that portion of Docket 12217 published in Weekly Traffic Bulletin of March 28, 1931, pertaining to silica flour). **Silica flour**, carloads, W. B.: Request for carload rate of 40c per 100 lb., minimum weight 100,000 lb., on silica flour from Group "F" to California, Tariff 1-J (I. C. C. Nos. 146, A312, 2392 and 1257 of Frank Van

Ummersen, W. S. Curlett, B. T. Jones and H. C. Toll, Agents, respectively).

SOUTHERN FREIGHT ASSOCIATION DOCKET

54968. **Sand and gravel,** carloads, from Siam, Tenn., to N. & W. R. R. stations. It is proposed to establish rates on sand and gravel, carloads (See Note 2), from Siam, Tenn., to N. & W. R. R. stations the same as approved under Submittal No. 53422 on crushed stone, carloads. Statement of the proposed rates will be furnished upon request.

55008. **Sand, gravel, clay gravel, crushed stone, slag, etc.,** between Elberton Eastern R. R. stations, also between Elberton & Eastern R. R. stations on the one hand and points in S. F. A. territory on the other. It is proposed to publish the standard line scale of rates on sand, gravel, clay gravel, crushed stone and slag, carloads, between stations on the E. & E. R. R., also between stations on the E. & E. R. R. and stations on other lines coming within the scope of I. C. C. Docket 17517, on interstate and intrastate traffic.

55021. **Crushed stone,** coated with oil, tar or asphaltum (amiesite), carloads, from Snow Flake, W. Va., to points in Carolina territory. It is proposed to revise the present rates on crushed stone, coated with oil, tar or asphaltum (amiesite), carloads (See Note 3), from Snow Flake, W. Va., to Elizabeth City, Reidsville, Durham and Fayetteville, N. C. Also establish rates to other destinations in Carolina territory on basis of the mileage scales prescribed by the Interstate Commerce Commission in Docket No. 22261. Statement of rates to representative points will be furnished upon request.

55070. **Sand, gravel, crushed stone,** etc., (a) between stations on the Mississippi Export R. R.; (b) between stations on the Mississippi Export R. R. on the one hand and points in southern territory on the other. It is proposed to establish the main line or trunk line basis of rates on sand, gravel, clay gravel, crushed stone, slag, etc., carloads, between M. E. R. R. stations and between M. E. stations on the one hand and stations on other carriers on interstate traffic within the scope of the territory embraced in I. C. C. Docket 17517 and related cases as published in Agent Glenn's I. C. C. A-655.

55127. **Stone and marble, viz.,** crushed marble or marble chips, carloads, from New Orleans, La., and Gulfport, Miss. (import, applicable from shipside), to Macon and Albany, Ga. Present rate, to Macon, Ga., 48c, Albany, Ga., 45c per 100 lb. (class rate). Proposed rates on stone and marble, viz., crushed marble or marble chips, carloads (See Note 3). (Applicable from shipside), from New Orleans, La., and Gulfport, Miss. (import, applicable from shipside), to Macon, Ga., 250c, to Albany, Ga., 230c per net ton—made in line with rates that have been established to other southern points.

55141. (a) **Sand, gravel, clay gravel, crushed stone and slag,** etc., carloads, between stations on the Shearwood Ry. and between stations on the Shearwood Ry. on the one hand and points in S. F. A. territory on the other; (b) **cement,** hydraulic, natural or portland, carloads, between stations on the Shearwood Ry. and between stations on the Shearwood Ry. on the one hand and points in S. F. A., C. F. A., I. F. A. and T. L. A. territories on the other. It is proposed to establish main line or trunk line bases of rates on sand, gravel, clay gravel, crushed stone, etc., carloads, and cement, carloads, between Shearwood Ry. stations and between its stations on the one hand and stations on other carriers on the other, and on interstate traffic within the scope of the territory embraced in Docket 17517 with respect to rates on sand, gravel, slag, etc., carloads, and Dockets Nos. 15806 and 15900 with respect to rates on cement, carloads.

55150. **Stone, crushed,** carloads, Conyers, Lithonia, Redan and Stone Mountain, Ga., to points in Louisiana and Texas. It is proposed to cancel through rate of 790c per ton on crushed stone published in Item 9845 of Agent Johanson's I. C. C. 2007, from Conyers, Lithonia, Redan and Stone Mountain, Ga., to Texas common points, and the through rate of 1022c per net ton as published in Item 5650 of Agent Johanson's I. C. C. 1957, from the same points to El Paso, Tex., and points taking same rates, applying combination in lieu thereof. The combination basis produces lower rates.

ILLINOIS FREIGHT ASSOCIATION DOCKET

5214-A. **Stone, crushed** (See Note 3), but not less than 60,000 lb., from Joliet, Ill., to Reddick, Ill. Present rate, $1.01; proposed, 88c per ton.

5319-B. **Sand and gravel,** carloads, from Chillicothe, Ill., to stations on Illinois Terminal R. R. Systems, viz., Belsey, Fravert, Lucas, Evans, Twin Grove, etc., Ill. Present rates, various; proposed, 88c per net ton.

1743. **Sand, all kinds** (See Note 3). To cancel existing commodity rates from Ottawa, Millington, Oregon, Sheridan, Utica, Wedron, Ill., and Muscatine, Ia., to Ohio River crossings, Cincinnati, O., and west thereof (applicable on traffic destined Carolina and Southeastern territories) now provided for in Item 1365-D, on page 27 of Sup. 49 to I. F. A. T. B. Freight Tariff 104-P, I. C. C. 2100.

6066. **Limestone, agricultural,** for soil treatment, in bags, barrels or in bulk, minimum weight 60,000 lb., from Buffalo and Linwood, Ia., to destinations in Illinois. Rates in cents:

Distance	Pres.	Prop.	Distance	Pres.	Prop.
5 miles to 30..	60	63	70 miles.....	90	76
35 miles.....	70	63	75 miles.....	90	76
40 miles.....	70	63	80 miles.....	90	76
45 miles.....	70	63	85 miles.....	90	88
50 miles.....	70	63	90 miles.....100		88
55 miles.....	70	63	95 miles.....100		88
60 miles.....	90	63	100 miles.....100		88
65 miles.....	90	63			

WESTERN TRUNK LINE DOCKET

1062-M. **Sand and gravel,** carloads (See Note 1), from Ottumwa, Ia., to stations in Missouri within a radius of 200 mi. of Ottumwa, Ia., single line. Present rates, various; proposed, I. C. C. Docket 21755 scale, single line.

7600. **Sand, molding,** carloads, from Lomax, Ill., to Detroit, Mich. Present rate, $3.65 per net ton; proposed, cancel account obsolete.

4742-K. **Sand and gravel** (See Note 3), but in no case will the minimum weight be less than 40,000 lb., from Chillicothe, Ill., to representative points:

To	Miles	Pres.	Prop.
West Keithsburg, Ia.....	91	$2.00	$1.20
Morning Sun, Ia.....	107	2.00	1.25
Martinsburg, Ia.	164	2.20	1.50
Oskaloosa, Ia.	187	2.20	1.60
Albia, Ia.	211	2.30	1.65

(Complete copy of exhibit will be furnished on request.)

6983-D. Rates, **sand,** carloads, as described in W. T. L. Tariff 41-R, from Millington, Oregon, Ottawa, Sheridan, Utica and Wedron, Ill., to points in Ontario. Rates in cents per net ton: To Belle River and Comber, Ont., present 378, proposed to cancel on account no movement; Ford, Ojibway, Point Edward, Sandwich, Sarnia, Walkerville and Windsor, Ont., present 353, proposed 350; Wallaceburg, Ont., present 328, proposed 350.

7357-A. **Sand and gravel** coated with asphalt or oil, carloads (See Note 3), but not less than 40,000 lb., between points in Nebraska, also from points in Nebraska to points in Iowa, also from Hawarden, Ia., to points in South Dakota (east of the Missouri river) and/or Nebraska. Present, no specific rates in effect; proposed, 10c per net ton over the existing Nebraska sand and gravel scale.

4092-E. **Chatts,** carloads (See Note 3), but in no case shall the minimum weight be less than 40,000 lb., from Waco, Mo., on the J.-P. Ry., also from Central City Spur, Mo., Chitwood, Mo., and Joplin, Mo., on the M.-K.-T. R. R., to Beagle, Kan. Present rate, 6½c per 100 lb.; proposed, $1.10 per ton of 2000 lb.

2556-W. **Sand, gravel,** as described in Item 2020-series, W. T. L. Tariff 50-N, from Bowes, Ill., to Iowa destinations, as per Item 2020, W. T. L. Tariff 50-N. Present rate, Chicago basis; proposed, Peoria basis.

SOUTHWESTERN FREIGHT BUREAU DOCKET

22846. **Crushed asphalt rock,** from Dougherty, Okla., to Marshfield, Mo. To establish a rate of 17c per 100 lb. on asphalt rock, crushed, carloads, minimum weight 40,000 lb., from Dougherty, Okla., to Marshfield, Mo. The above rate is the same as has been approved to Mansfield, Mo. The distance to Marshfield is 20 miles less than the distance to Mansfield, and while this station is not intermediate to Mansfield, it is stated that a higher rate could not be justified in view of the less service performed.

22876. **Sand and chatt sand,** from Joplin, Mo., district points to Brownson, Ala. To establish the following rates in cents per 100 lb. on sand and chatt sand (not to apply on asbestos or silica sand), carloads, minimum weight 100,000 lb., from Joplin, Mo., district points shown below to points in Alabama.

From Points in Missouri to Brownson, Ala.

Missouri Pacific		Cave Springs	20
		St. L.-S. F. Ry.	
Alba	18	Cagle	18
Atlas	18	Carl Junction	18
Carthage	18	Carterville	18
Duenweg	18	Carthage	18
Granby	18	Duenweg	18
Joplin	18	Joplin	18
Neck City	18	Oronogo	18
Oronogo	18	Oronogo Junction	18
Porto Rico	18	Smithfield	20
Purcell	18	Webb City	18
Webb City-Carterville	18	M. & N. A. Ry.	
J. & P. Ry.		Joplin	18
Carl Junction	18	K. C. S. Ry.	
Chitwood	18	Chat Junction	18
M.-K.-T. R. R.		Athletic Spur	18
Joplin	18	Princess Spur	18
Chitwood	18	Byrd Spur	18
Central City Spur	20	Joplin	18

From Points in Kansas to Brownson, Ala.

S.W. Mo. R. R.		St. L.-S. F. Ry.	
Baxter Springs	20	Baxter Springs	20
K. O. & G.		Galena	20
Baxter Springs	20	Peacock	20
M.-K.-T. R. R.		Pershing	20
Galena	20	K. C. S. Ry.	
		Baxter Springs	20

Producers of chatt sand in the Joplin, Mo., district are requesting rates to Brownson, Ala., located on the L. & N. R. R. between Attalla and Calera, Ala., not far from Birmingham, Ala. The basis here proposed is 8½% of the I. C. C. Docket 13535 first class rate and is the same basis as recently proposed and approved to Birmingham, Ala., and Knoxville, Tenn., in S. W. F. B. Docket 18924. Shippers advise they have information from consumer at Brownson, Ala., that he can use chatt sand in carload quantities. Joplin district points shown below are the same as those approved in S. W. F. B. Docket 18924.

22918. **Silica sand,** from Ada, Okla., to Santa Anna, Tex. To establish a rate of 14c per 100 lb. on silica sand, as described in Item 2806A, S.W.L. Tariff 26-Z, carloads, from Ada, Okla., to Santa Anna, Tex. A glass bottle factory has just been completed at Santa Anna, Tex., and is now manufacturing glass bottles, etc. At the present time there are no through commodity rates on silica sand from Ada, Okla., to Santa Anna, Tex. The rate herein proposed is based on 9½% of the Column 100 13535 scale and is higher than would result if the rate based upon the Santa Fe distance was used in connection with the scale published in Item 2806-A, Supplement 57, S. W. L. Tariff 26-Z.

TEXAS-LOUISIANA TARIFF BUREAU DOCKET

S-7966-TX. **Sand and gravel,** carloads, from Hobbs' Gravel Pit to Temple, Tex.: Proposition from shippers to establish rate of $12 per car not loaded in excess of marked capacity—on cars loaded in excess of marked capacity, the charge per ton for excess loading shall be in proportion to the charge per ton under per car charge as prescribed above. Will not apply as basing rate or in dividing through rate. Switching charges of other lines to locations on lines other than the M.-K.-T.-T. in Temple will be added to the line haul rate to Temple.

Proposed per car charge to meet truck competition. This traffic is now moving by truck and carriers have been given assurance that same will move via rail is they establish the proposed rate.

I. C. C. Decisions

22688. Gravel. Southern Paving Construction Co. vs. Atlantic Coast Line R. R. Co. et al. Complainant alleges rates charged on 156 carloads of gravel and crushed stone from Lilesville (Concrete Siding), N. C., to Todds Still, S. C., and on 17 carloads of the same commodities to Marion, S. C., delivered between Aug. 9 and Oct. 3, 1927, inclusive, were inapplicable, unreasonable, and in violation of the aggregate-of-intermediates provision of section 4 of the Interstate Commerce act. Reparation only is sought. Claims based on the allegations under sections 1 and 4 of the act, covering shipments delivered or tendered for delivery prior to Aug. 11, 1927, are barred by the statute. It appears from the complainant's memorandum of facts and argument that all the shipments consisted of gravel. Rates are in amounts per net ton.

Lilesville is on the Seaboard Air Line, 4.9 mi. east of Wadesboro, N. C. Shipments to Marion were routed by the shipper "via A.C.L." and moved over the Seaboard to Maxton, N. C., thence Atlantic Coast Line. Shipments to Todds Still were unrouted and moved over the Seaboard to Wadesboro and the Coast Line beyond. Charges were collected at a combination rate of $1.53 to both destinations, composed of a rate of 45 cents from Lilesville to Wadesboro and $1.08 beyond. Shipments to Marion did not move via Wadesboro and the applicable rate on these shipments was a combination rate of $1.79, composed of 80 cents from Lilesville to Maxton and 99 cents beyond. Shipments to Marion were

undercharged. Rate charged to Todds Still was applicable. Reparation is sought based on rates of $1.17 and $1.22 to Todds Still and Marion, respectively.

During the period of movement there were rates of $1.17 to both Todds Still and Marion. Rate to Marion was composed of 79 cents over the Seaboard to Dillon, S. C., and 68 cents over the Coast Line beyond. These factors were subject to the combination rule, which authorized a deduction of 30 cents from each factor and an addition of 30 cents to the resulting total. Rate to Todds Still was composed of $1.02 over the Seaboard to Mullins, S. C., and 45 cents over the Coast Line beyond. These factors were also subject to the combination rule. As before indicated the shipments were not specifically routed. As stated in the Interstate Commerce Commission report, in the absence of specific routing instruction it is the duty of the carriers to transport the shipments over the cheapest available reasonable route. The routes via Mullins and Dillon were the cheapest available reasonable routes to Todds Still and Marion, respectively. Shipments were, therefore, misrouted by the Seaboard.

The Commission report further states that there is no evidence that the rates over the routes the shipments should have moved were unreasonable or in violation of section 4 of the act. The rates charged on shipments to Marion were inapplicable; that the applicable rate was $1.79; that shipments to Marion and Todds Still were misrouted by the Seaboard; that complainant received shipments and paid and bore the charges thereon; that it was damaged thereby in the amount of the difference between the charges paid and those which would have accrued had the shipments been forwarded via Dillon and Mullins, respectively; and that it is entitled to reparation from the Seaboard Air Line, with interest. Complainant should comply with Rule V of the Rules of Practice.

The outstanding undercharges on the shipments to Marion may be waived.

23068. **Ground Limestone.** New Castle Lime and Stone Co. et al. vs. Aliquippa and Southern et al. In a report written by Commissioner Eastman, the I. C. C. has found unreasonable, unduly prejudicial and preferential the rates on ground limestone from Shaw Junction, Penn., to destinations in New York, Pennsylvania, Maryland and West Virginia. The finding of unreasonableness is both as to the past and the future. Reparation has been awarded and new rates are to be made effective not later than July 27. The reparation is on shipments made since January 10, 1930.

The finding is that the rates on ground limestone to destinations in New York, Pennsylvania, Maryland and West Virginia, on and west of a line connecting Olean, N. Y., Cresson, Penn., and Cumberland, Md., were and for the future would be unjust and unreasonable to the extent that they exceeded or might exceed the rates set forth in an appendix (not herein reproduced) and that in their relation to rates on the same commodity from Buffalo, N. Y., Gibsonburg, Ohio, Greer, W. Va., and points in the Bellefonte, Penn., and Martinsburg, W. Va., districts to the same destination territory, they were unduly prejudicial to the complainants and unduly preferential of their competitors at the other producing points before mentioned.

The scale to be used provides the rates for single-line and for joint-line hauls, based on a minimum of 60,000 lb., in cents a net ton. The single-line scale begins with a rate of 60c for 5 mi.; becomes 100c for 50 mi.; 135c for 100 mi.; 185c for 200 mi., and 225c for 300 mi.

The joint-line scale begins with a rate of 80c for 5 mi.; 120c for 50 mi.; 150c for 100 mi., and 170c for 160 mi. From 180 mi. onward the single and joint-line rates become the same. At 180 mi. the rate is 175c; 200 mi., 185c, and 300 mi., 225c.

In the computation of distances the shortest distance over routes allowing the movement of traffic without transfer of lading are to be used.

21026. **Crushed stone.** Carbon Limestone Co. vs. Pennsylvania Railroad Co., et al. Rates on crushed stone, in carloads, from Hillsville, Penn., to destinations in New York, Pennsylvania, and West Virginia, found not unreasonable or otherwise unlawful. Case dismissed.

Within the Hillsdale district numerous competing producers of crushed stone have available the Penn scale single-line rates, while the complainant must ship at the Penn scale joint-line rates, in the specified consuming territory.

Complainant's chief concern is to secure the benefit of Penn scale single-line rates in order that it may successfully compete with other producers selling consumers in this area. It was found that the rates assailed were not shown to be unreasonable or otherwise unlawful.

State Railroad Commissioners Favor Plaster-Board Rate Revision

AT THE RECENT hearing on plaster-board freight rates held at Ft. Dodge, Ia., state railroad commissioners from Kansas, Nebraska and South Dakota expressed the opinion that freight rates should be revised as requested by the Gypsum Association.

This association is asking for a mixed car rate on plaster- and wall-board more in line with plaster rates. The wallboard rate is higher than the plaster rate. At present when both are shipped in the same car the entire shipment is carried at the higher rates. It is also claimed that transcontinental rates are higher on gypsum shipments originating in Iowa, Texas and Oklahoma moving west than on similar shipments eastbound from the Pacific states.—*Ft. Dodge* (Ia.) *Messenger.*

Increase Sought in Mississippi Road Materials Rate

AN INCREASE OF approximately $500,000 annually in gravel and other road material rates is involved in a new schedule of rates being sought by all railroads operating in Mississippi with the exception of the Gulf and Ship Island line.

The application, filed with the Mississippi Railroad Commission, was heard on behalf of the operating lines, but protestants given 30 days in which to file answers.

Since the increased rates would affect road work in the state and would apply to the taxpayers instead of the shippers, the contestants to the increase include the State Highway Commission and the 82 county boards of supervisors.

"This cause more directly concerns highway development in Mississippi than any other interest," said Commissioner John L. Smith, of Jackson.—*Jackson* (Miss.) *News.*

I. C. C. Reduces Limstone Rate

A REDUCTION of freight charges amounting to about 40c. a ton to various shipping destinations on ground limestone used as agricultural fertilizer and for coal-mine dusting was granted by the Interstate Commerce Commission April 30.

Discrimination against the makers of this product in the Youngstown, Ohio, area was brought before the commission by the Traffic Bureau of the Chamber of Commerce on behalf of the Carbon Limestone Co., the Lake Erie Limestone Co. and the New Castle Lime and Stone Co. shipping their product from the Hillsville district through Shaw Junction, Penn., on the P. and L. E. railroad.

Rates now have been placed on parity with rates from competing points at Buffalo, Gibsonburg, Greer, Bellefonte and Martinsburg. Rates for the future have been fixed at $1 for 50 mi. and $1.85 for 200 mi., while present rates ranged up to $1.40 and $2.20 for similar distances.—*Youngstown* (Ohio) *Vindicator.*

Sand and Gravel Rate Hearing Held

CHARLES D. SHUKERS, member, and I. C. Peterson, rate clerk, for the Kansas public service commission, left May 5 for Washington, D. C., to represent the Kansas commission before the Interstate Commerce Commission in an investigation into sand, gravel, chat and other road material freight rates between Kansas and Missouri on the one hand and points in southwestern territory on the other. Decreases in intrastate rates on road building material in Missouri; and between points in Kansas and points in Missouri, also are involved in the proceeding.

Three years ago the Interstate Commerce Commission prescribed rates for the southwest considerably lower than the rates in Kansas and Missouri. A year ago the Kansas public service commission established the same rate base for shipments inside Kansas. As a result the Kansas highway commission has saved $115,000 in freight charges in a year. But the old higher rate level still is in effect between Missouri and Kansas, in Missouri, and between these two states and the southwest.

About the time the Kansas commission established the southwest rate level for intrastate shipments, the Missouri commission filed application for investigation of Missouri and Kansas rate structure. This case was argued in Washington May 7.—*Topeka* (Kan.) *Capital.*

Cement Association Awards Trophies

Safety Prizes Given at Luncheon Session in New York

AT a luncheon "safety session" of its spring meeting, held at Hotel Biltmore, New York, on May 12, the Portland Cement Association formally canvassed the accident records of its member plants during 1930 and awarded its annual trophy to 43 mills which were found to have operated through the calendar year without an injury serious enough to cause a single day's loss of pay. The occasion was the most imposing of its kind the association has yet held and was easily the popular interest feature of the entire three-day meeting. About one-third of the mills which operated last year won awards, which with the number given at this meeting constituted 42½% of the entire number of awards since the contest was established in 1923.

After listening to the report of the Committee on Accident Prevention, which was unanimously accepted by the association, Chairman of the Board Frank H. Smith, who presided, made the following address in proceeding with the ceremonies of award:

"We have now arrived at what is probably the most interesting as well as the happiest feature of our entire meeting. The progress made by the mills of this industry in accident prevention during the past few years is almost beyond our comprehension. It speaks well indeed for our old pioneers who conceived and planned the effort; it pays glowing compliment to the enthusiastic and active committees which have led in this work, and it makes every one of us extremely proud of the men of this industry who have carried on so gloriously and who give us so much promise for the future.

"At the table with me here today are a number of men who have been conspicuous for their help in organizing and carrying forward the accident prevention work of our industry. I will request each to arise as his name is mentioned. As former chairmen of our Committee on Accident Prevention and Insurance we have Gabriel S. Brown, who presided over its destinies during 1916, and A. C. Tagge, who served similarly from 1922 to 1926. Then we have the membership of early committees represented by W. S. Mallory, who was appointed in 1912; B. F. Affleck, 1915, and Henry A. Reninger, 1915. Next to me here on my left is Joseph Brobston of Nazareth, whose date on the committee I cannot recall but who has been a fiery advocate of safety as long as our recollection serves; and on my right is J. B. John, your present illustrious committee chairman, who is largely responsible for the necessity for the wholesale nature of this award here today. He operates eight plants, and I don't understand how it is that he and his associates from these mills have come here to take away only seven trophies.

"I will now request the secretary of the Committee on Accident Prevention to read the list of plants which are candidates for our safety trophy award for 1930, giving the condensed record of each. As the name of each delegate is read, he will please arise and remain standing."

Committee Secretary Reads List

The secretary of the Committee on Accident Prevention and Insurance then read a condensed record of each mill recommended by the committee to receive the award and vouched for the thoroughness of the canvass of the records, which, he stated, was supported by substantial documentary evidence open for inspection to all. The list of the plants and names of plant delegates who arose as Mr. Curtis gave their names and records are given at the conclusion of this report. The appearance of the 77 plant delegates, occupying about one-third of the space in the music room where the luncheon was held, led to prolonged applause.

Delegates chosen to represent the various winning mills included men of practically all occupations in the operating departments: Works managers, superintendents, assistant superintendents, mill and quarry foremen, engineers, electricians, chemists, master mechanics, burners, repairmen and others occupying positions of greatly varying responsibility, but all men of long experience in the safety movement within the cement industry.

Joseph Brobston Makes Award

Chairman Smith presented Joseph Brobston, vice-president of the Nazareth Cement Co. and one of the three remaining members who attended the first meeting of the association in 1902, when it was organized. In making the formal award, on behalf of the association, Mr. Brobston said:

"This should be a proud day for the Portland Cement Association; for J. B. John, whose heart and soul are in this work; for A. J. R. Curtis, who has been his right hand; but most of all for you who are here to represent your plant organizations, and to accept the visible tokens awarded by the Association for the good work accomplished.

"Ten years ago, I do not believe that there was one man in this industry who honestly believed that it was possible for any cement plant to be in continuous operation for a period of a year, without suffering a lost-time accident; and yet today 43 plants—over one-third of our membership—have passed through the year 1930 without a single man in their organizations being injured seriously.

"I do not believe that most of us realize what this means, but when you consider that at these plants, the ones in which no accidents occurred in 1930, in 1925 14 men were killed and 406 injured, we can well claim that the Association has not lived in vain.

"The portland cement industry today can proudly claim that its record is the best that any group reporting to the National Safety Council can show. In fact, our accident rate is only one-third of the average of that of all industries reporting.

"And how has this been accomplished? By hard work and eternal vigilance on the part of those at our mills! Yes. But let me tell you that that alone would not have been enough. Those in charge at the mills studied the problems—searched until they found underlying causes. Analyzed these cases thoroughly, devised methods for meeting the hazards involved—then sold them to their fellow employes, and secured 100% cooperation on the part of their organizations.

"And the result of this kind of work was the brilliant and shining success to which we are bearing witness today.

"Our mills have not failed us; but when we consider some of the conditions facing us today can we honestly say that we, in other departments, have faced and solved our problems as efficiently and successfully?

"With the exception of Colonel Young and Mr. Lesley, I am probably the only man here today who was present when this Association was formed. I have seen its wonderful growth and development, but of its many great achievements, the one of which I am most proud, is the safety record for the year 1930.

"This Association may cease to function and pass away. In time to come others will follow you who may not know the toil and tribulation through which you have passed to reach the pinnacle of success to which your spotless records bear witness, but these trophies, which I have the honor to present to you, will forevermore be a monument to remind future generations of the wonderful humanitarian work inaugurated by this Association and carried to fruition by the

personal efforts of you, who honor us by your presence here today.

"All honor to you and your associates for the work done, and our wish for you today is that your motto will be ever 'Onward!' until a perfect record is attained by every plant in our industry."

Following Mr. Brobston's address six of the delegates were selected to respond on behalf of the entire group. Those who spoke were as follows:

Homer Haruff, general mill foreman, Pacific Portland Cement Co., for the western winning mills.

J. G. Statler, chemist, Lehigh Portland Cement Co., Iola, Kan., for the midwestern winning mills.

S. F. Barrera, timekeeper, San Antonio Portland Cement Co., San Antonio, Tex., the first plant in the association to win the trophy, for the southern winning mills.

James Baptie, master mechanic, Canada Cement Co,. Exshaw, Alberta, for the Canadian winning mills.

Phillip Mooney, engineer, Medusa Portland Cement Co., Dixon, Ill., for the central states winning mills.

Edward Schwartz, plant chemist, Pennsylvania-Dixie Cement Corp., Portland Point, N. Y., for the eastern winning mills.

Mr. John Gives Dinner

On Monday evening, May 11, J. B. John, chairman of the Committee on Accident Prevention and Insurance of the association, entertained at dinner the 77 delegates present in New York at that time. The dinner, which was given in the west ballroom at Hotel Commodore, was a unique affair in that none but mill men were permitted to sit down, and the entire evening was occupied with an informal exchange of safety ideas by those present. The delegates were seated in order of their length of service in the industry, the places of honor being occupied by the men with the longest records, 36 years and 33 years respectively.

In his address of welcome to the men, Chairman John traced the progress of the safety movement in the cement industry and spoke briefly of the principles which had led to success.

List of Delegates of Winning Mills

Lehigh Portland Cement Co., Iola, Kan. (1574 days). **J. G. Statler,** chief chemist, employed in cement industry 24 years. **Clarke Gilbert,** construction foreman, employed in the industry 22 years.

Alpha Portland Cement Co., Ironton, Ohio (1484 days). **F. C. Brownstead,** superintendent. Employed at Ironton mill 25 years. Member of plant safety committee several years. Has been in the cement industry for 29 years, eleven of which have been with present company. **J. S. Beddall,** chemist. Employed by this company 10 years. In that time there has not been an accident in his department. Member of mill safety committee.

Medusa Portland Cement Co., Toledo, Ohio (1001 days). **F. J. Snody,** paymaster. Employed in this plant 8 years. **E. L. Juday,** yard foreman. Employed 22½ years with the Medusa company and in the Toledo mill 4 years. Member of the plant safety committee. Has not suffered a lost-time accident himself for 20 years. The yard department has not been charged with a lost-time accident for almost 5 years.

Lehigh Portland Cement Co., Ormrod No. 2, Pa. (887 days). **Olin A. Griesemer, chief electrician.** Employed in present mill 22 years. Was one of the original organizers of the original Lehigh safety committee at Ormrod in 1914. Is now chairman of the Workmen's Inspection Committee. **George H. Leibensberger,** mill shift foreman. Employed in present location 30 years. A member of the Lehigh Safety Committee at Ormrod since its organization in 1914. Drove the horse-drawn ambulance very frequently at the original No. 1 Ormrod plant 25 years ago.

Lehigh Portland Cement Co., Birmingham, Ala. (858 days). **Oliver C. Brown,** chief clerk. Employed at the present mill 6 years and in the industry 25 years. Secretary of the plant safety committee. **Algeth Carlson,** mill foreman. Employed at the present mill 8 years and in the industry 30 years. Member of the plant safety committee.

Pacific Portland Cement Co., Redwood City, Calif. (765 days). **Homer H. Haruff,** general mill foreman. Employed in the cement industry 33 years, 25 years of which have been spent with the Pacific company, and for the last four years he has been employed at the Redwood City plant. He is a member of the mill safety committee and his department has not had an accident for 881 days. **G. T. Chaney,** clerk. He has been employed in the present mill 6½ years. He takes an active part in all safety activities of the plant and is a student of first aid.

Joseph Brobston

Great Lakes Portland Cement Corp., Buffalo, N. Y. (742 days). **Dana C. Hammond,** mill foreman. Employed 4 years in the present mill. He has never had a lost-time accident in his department. **George H. Smith,** chief electrician, who acted as substitute for **Wallace Loyst,** kiln burner, who was prevented from attending through illness.

Canada Cement Co., Ltd., Port Colborne, Ont., Canada (628 days). **William C. Burgess,** foreman, kiln department. Employed at the present mill 22 years. Member of the plant safety committee. There have been no lost-time accidents in his department for 7 years. **Howard Naish,** railroad department repairman. Employed at this mill 8 years. Active in safety plays.

Nazareth Cement Co., Nazareth, Pa. (624 days). **Lawrence Rice,** safety engineer. Employed in the cement industry 6 years, all of which time has been spent in the present mill. He is the chairman of the mill safety committee and is very active in the safety work at the plant. **William Gaston,** assistant quarry foreman. Employed in the cement industry 22 years, 12 years of which time has been spent with the present company in the same mill. His department has not been charged with a lost-time accident since March, 1929.

Lehigh Portland Cement Co., Mitchell, Ind. (575 days). **Hugh H. Purkhiser,** master mechanic. Employed 29 years in the present mill. He is vice-chairman of the plant safety committee and has never had a lost-time accident. **Walter Stroud,** machine shop foreman. Employed 24 years in the present mill. Member of the permanent safety committee and has never had a lost-time accident. The last accident in the machine shop occurred in May, 1922.

Alpha Portland Cement Co., Birmingham, Ala. (556 days). **Guy D. Youell,** general mill foreman. Employed in the cement industry 22 years, and he has spent 5 years in the present mill. He is a member of the plant safety committee and for 15 years has not had a lost-time accident. **W. L. Dandridge, chief clerk.** Employed in the cement industry 4 years, all of which time was spent in the present mill. He is a member of the mill safety committee and has not had an acident for 20 years.

Alpha Portland Cement Co., Cementon, N. Y. (555 days). **Edward Flanagan,** machine shop foreman. **William Garis,** assistant chemist.

Vulcanite Portland Cement Co., Vulcanite, N. J. (536 days). **Jason Todd,** foreman, belt department. Employed in the present mill 17 years. Member of the plant safety committee. **Ray Renkert,** machinist. Employed at the present mill 22 years. Member of the plant safety committee and has never suffered a lost-time accident himself.

Wellston Iron Furnace Co., Superior, Ohio (534 days). **C. F. Von dem Bussche,** general manager and treasurer. He has been in the cement industry for one year. **John A. Blank,** general superintendent. Employed at the present mill 14 years and in the industry 30 years. He is very active in accident prevention work.

Lehigh Portland Cement Co., Sandt's Eddy, Pa. (529 days). **Henry M. Dickenschied,** chemist. Employed in the cement industry and by the same company 25 years. Member of the plant safety committee and his department has never been charged with a lost-time accident. **George Kauffman, Jr.,** assistant chief steam engineer. Employed in the cement industry 17 years, 5½ years of which have been with the Lehigh company. He is a member of the plant safety committee and his department has not suffered a lost-time accident for over 5 years.

Crescent Portland Cement Co., Wampum, Pa. (520 days). **John Brommer,** general mill foreman. Employed 27 years with the same company in the present mill. He is a member of the plant safety committee and himself has never suffered a lost-time accident. **F. M. Miles,** shovel operator. Employed 22 years with the same company in the present mill. He is a member of the plant safety committee and himself has never suffered a lost-time accident.

North American Cement Corp., Hagerstown, Md. (510 days). **John H. Zaiser,** chief power engineer. Employed 3 years with the same company in the present mill. He is assistant chairman of the plant safety committee and has never suffered a lost-time accident. The power department has not had a lost-time accident for 2,786 days. **Otha C. Brandenburg,** mechanic. For 12 years with the same company in the present mill. Member of the plant safety committee and has never had a lost-time accident. His own department has not suffered an accident for 2,428 days.

Petoskey Portland Cement Co., Petoskey, Mich. (506 days). **Lyle E. Ernst,** chief clerk and foreman of packing and loading department. Employed 12 years at this plant. Has never himself suffered a lost-time accident. Member of mill safety committee. **Chester Bischoff,** mill repairman. Employed at this plant 8½ years. Has not suffered a lost-time accident for 7 years.

North American Cement Corp., Howe's Cave, N. Y. (501 days). **Raymond Young,** storekeeper. Employed 16 years at the Howe's Cave plant and has been with the same company for 20 years. He is vice chairman of the general safety committee of the plant. He has never suffered a lost-time accident. **Leo Wood,** repairman. Employed 7 years at the Howe's Cave plant. He is a member of the safety merit club and his department has not been charged with a lost-time accident for 5 years.

Alpha Portland Cement Co., LaSalle, Ill. (499 days). **Joseph W. Temm,** chief electrician. Employed 13 years at the La Salle plant. Chairman of the plant safety committee, and the electrical department at his plant has not been charged with a lost-time accident since October, 1925. **Walter O. Menning,** machinist. For 14 years with the same company in the present mill. His department has not been charged with a lost-time accident since September, 1926.

Bessemer Cement Corp., Buffalo, N. Y. (489 days). **C. F. Genger,** packhouse foreman. Employed in the industry 20 months, all of which time has been with the present company. Chairman of the mill safety committee and his department has not suffered a lost-time accident since his employment. **O. R. Overby,** welder. Employed in the industry 7 years, 4 2/3 years of which time were spent in the present mill. Member of the mill safety committee and has never suffered a lost-time accident.

Universal Atlas Cement Co., Universal, Pa. (484 days). **J. J. O'Malley,** general foreman. Employed 23 years at this mill and in the industry 30 years. Member of the plant general safety committee. Has never himself suffered a lost-time accident. **Fred Smith,** master mechanic. Employed 22 years in this plant which represents his entire experience in the industry. Member of plant general safety committee. Has never himself suffered a lost-time accident.

Medusa Portland Cement Co., York, Pa. (White Plant), (475 days). **Ralph Ashton**, general mill foreman. Employed almost 10 years in the same plant. Member of mill safety committee. Has never suffered a lost-time accident. **S. C. Kohr**, chief electrician. Employed almost 5 years in this mill representing his entire experience in the industry. Member of mill safety committee. Has never suffered a lost-time accident.

Alpha Portland Cement Co., St. Louis, Mo. (474 days). **A. R. Gardner**, plant electrician. In the cement industry 26 years, 21 years of which have been spent in the present mill. He is a member of the plant safety committee and his own department has not been charged with a lost-time accident since November, 1924. **E. G. Hammer**, safety worker. Employed in the cement industry for 20 years, all of which time was spent in the present mill. He is the chairman of the plant safety committee and is very active in the safety work at this plant.

Manitowoc Portland Cement Co., Manitowoc, Wis. (455 days). **Otto Stein**, repairman. In the cement industry for 7½ years, all of which time was spent in the present mill. Has served on safety committee. He has never had a lost-time accident. **Harvey Backus**, foreman, packhouse and sack department. Employed in the cement industry for 10 years, 4½ years of which were in the present mill and with the same company. Member of the general safety committee and has never had a lost-time accident.

Pennsylvania-Dixie Cement Corp., Portland, Point, N. Y. (450 days). **Edward Holmes Schwartz, plant chemist.** Employed in the industry 24 years, and with the present company at this plant 14 years. He is a member of the plant safety committee. **Clarence Brobst**, repairman. Employed in the industry 16 years, 9 years of which were spent at the present mill. He is a member of the plant safety committee.

Lehigh Portland Cement Co., Fogelsville, Pa. (433 days). **Thomas C. Kuhns**, chief plant chemist. Employed in the cement industry 28 years, all of this time with the Lehigh company and 24 years in the present mill. He is the chairman of the plant first-aid committee and there has not been an accident in the chemical department for 28 years. **Sherwood S. Shaffer**, chief engineer, power department. Employed 23 years in the same mill. He is the chairman of the fire and sanitary committee of the plant and his department has not been charged with a lost-time accident since December, 1927.

Medusa Portland Cement Co., Bay Bridge, Ohio (425 days). **Arden F. Krebs**, assistant superintendent. In the cement industry 13 years, all of this time with the Medusa company, and 11 years at the Bay Bridge mill. Member of the mill safety committee and himself has never suffered a lost-time accident. **Albert Wobser**, general mill foreman. Employed 28 years at the Bay Bridge mill. Member of the mill safety committee and very interested in safety work.

Alpha Portland Cement Co., Manheim, W. Va. (418 days). **W. L. Matthes**, superintendent. Employed 15 years with the Alpha company and 9 years at the Manheim plant. He is a member of the plant safety committee and as such is very active in accident prevention work. **L. M. Smith**, chemist. In the cement industry 23 years, all of which time has been spent with the Alpha company and 20 years in the present mill. Member of the plant safety committee, and his department, the laboratory, has never been charged with a lost-time accident.

Medusa Portland Cement Co., Dixon, Ill. (412 days). **Harry J. Kennedy**, assistant superintendent. Employed in the cement industry 23 years, 7 years in the present mill. He is a member of the plant safety committee and has never suffered a lost-time accident himself. **Philip Mooney**, plant engineer. Employed in the cement industry 6 years, all of which time has been with the present mill. He is the chairman of the mill safety committee and has never himself suffered a lost-time accident.

Diamond Portland Cement Co., Middle Branch, Ohio (405 days). **George W. Henning**, assistant superintendent. Employed in the cement industry for 33 years, 19 years in the same mill. Chairman of the mill safety committee and has never himself suffered a lost-time accident. **Wilton Stull**, foreman, kilns and coal house. Employed in the cement industry 36 years, 14 years in the same mill. Member of the mill safety committee and his department has not been charged with a lost-time accident for 5½ years.

Canada Cement Co., Ltd., Fort Whyte, Man., Canada (398 days). **James F. Smith**, machinist. Employed 17 years in the present mill. The machine shop at this plant has not been charged with a lost-time accident since February, 1924. **Robert Eccles**, timekeeper. Employed in the industry 28 years, 21 years of which were with the same company and 9 years in the present mill. He is the secretary of the plant safety committee.

Canada Cement Co., Ltd., Exshaw, Alta., Canada (391 days). **James N. Baptie**, master mechanic. Employed 20 years in the present mill. One of the original members of the plant safety committee which has been functioning for 11 years. Known as a leader in the safety work at his plant, having never been injured during the time of his employment and there has not been an accident in the machine shop since March 17, 1926. **William H. Robinson**, mill repairman. For 7½ years at the present plant. Has not had a lost-time accident in his department since April 22, 1926, and has never himself suffered a lost-time accident.

Pennsylvania-Dixie Cement Corp., Nazareth, Pa. (390 days). Delegates: **Earl C. Rinker**, blacksmith foreman. In the industry 22 years, 21 years in the present mill. Chairman of the plant safety committee and has not had an accident charged against his department for over 11 years. **Samuel Ruth**, electrician. Employed in the industry 12½ years, all of which time was spent in the present mill. Formerly chairman of the plant safety committee and his department has not been charged with a lost-time accident since March, 1928.

San Antonio Portland Cement Co., San Antonio, Texas (386 days). **H. O. Rinehold**, plant manager. Employed 21 years with this company in the present mill. **S. F. Barrera**, timekeeper. Employed 20 years with this company in the present mill.

Newaygo Portland Cement Co., Newaygo, Mich. (385 days). **A. G. Trexler**, master mechanic. Employed in the industry 24 years, 22 years of which has been with the Newaygo company at the present mill. Chairman of the plant safety committee from 1925 to 1930 inclusive. His department has not been charged with a lost-time accident since January, 1928. **Ralph Evans**, tube mill operator. Employed 30 years with the same company. Member of the plant safety committee and his department has not been charged with a lost-time accident since October, 1926.

Trinity Portland Cement Co., Fort Worth, Texas (384 days). Delegates: **A. A. Chaney**, mill superintendent. Employed in the cement industry 29 years, 8 years of which have been in the present mill. He is a member of the plant safety committee and he has not had a lost-time accident to himself in 11 years. **A. E. Morris**, foreman, shipping department. Employed in the cement industry 7 years, all of this time in the Fort Worth plant. He is the chairman of the plant safety committee and captain of the first-aid team, and very interested in all safety activities. His department has not been charged with a lost-time accident since June, 1928.

Lehigh Portland Cement Co., Newcastle, Pa. (384 days). **Wesley Davy**, master mechanic. Employed 22 years at the Newcastle mill. He is a member of the plant safety committee and his department has not been charged with a lost-time accident since December, 1928. **Charles H. Schlicher**, chief clerk. Employed in the industry 30 years, all of which time has been with the Lehigh company, and the last 17 years in the present mill. He is a member of the mill safety committee.

Lone Star Cement Co., Ind., Inc., Greencastle, Ind. (369 days). **O. C. Staggs.**

Masonry Materials Weathering Characteristics Feature of A. S. T. M. Meeting

A SYMPOSIUM on the weathering characteristics of masonry materials will be one of the features of the thirty-fourth annual meeting of the American Society for Testing Materials, to be held in Chicago, June 22-26. This symposium will take up the entire tenth session, Thursday morning, June 25. Its purpose is to bring out available information on the weathering of masonry materials and to emphasize those phases which require further study and on which information is incomplete. This question is of great importance in most structures.

Papers to be given in this symposium are: (1) "Economic Aspects of Masonry Decay from Weathering Effects," H. S. Brightly, Secy.-Director, Building Stone Association of Indiana, Inc. (2) "Weathering of Concrete," E. Viens, Director, Testing Laboratories, Department of Public Works, Ottawa, Canada. (3) "The Weathering of Structural Clay Products," J. W. McBurney, Research Associate, Common Brick Manufacturers' Association, Bureau of Standards. (4) "Weathering of Stone and Slate," G. F. Loughlin, U. S. Geological Survey, and C. H. Behre, Department of Geology, University of Cincinnati. (5) "Weathering of Aggregates," L. O. Hanson, University of Wisconsin. (6) "Weathering Test Procedures for Various Masonry Materials," F. H. Jackson, Senior Engineer of Tests, U. S. Bureau of Roads; H. D. Foster, Research Engineer, Ohio State University; D. W. Kessler, Civil Engineer, Bureau of Standards; and (7) "Bibliography and Abstracts on Weathering of Masonry," F. O. Anderegg, Consulting Engineer, F. R. McMillan, Portland Cement Association; D. E. Parsons and D. W. Kessler, Bureau of Standards.

The symposium has been arranged by a special Co-ordinating Committee on Weathering Characteristics consisting of representatives of several of the A. S. T. M. Standing Committees interested in this field.

Fluorspar Industry in 1930

THE FLUORSPAR INDUSTRY was adversely affected during 1930, the domestic fluorspar producers' volume of business being the smallest since 1921, according to a statement prepared by Hubert W. Davis, of the United States Bureau of Mines, Department of Commerce. Of interest are the substantial decrease in domestic shipments; the pronounced increase in imports from Germany and France; the increase, effective June 18, from $5 to $7.50 a short ton in the rate of duty on fluorspar containing 93 to 97% of calcium fluoride; the large stocks of fluorspar at consumers' plants on December 31, especially the stocks of 89,000 short tons that have been accumulated at basic open-hearth steel plants; and the accomplishment of the first river-rail shipments of fluorspar to the Pittsburgh district.

Shipments of fluorspar from mines in the United States in 1930, were 95,849 short tons. The general average value for all grades per ton f.o.b. mine shipping points was $18.22, 84 cents less than the 1929 average.

There was a decrease in shipments of fluorspar in 1930 to each of the industries, except the cement industry, in which the mineral is used.

Lime Association Issues Data on Lime Mortar

A BOOKLET, "Lime Mortar, Its Relation to Watertight Masonry," recently issued by the National Lime Association, Washington, D. C., briefly presents the past versus the present practice in masonry materials; the various properties of mortar and other factors which influence the quality of unit masonry, including a discussion of efflorescence; a consideration of strength requirements; the cost of masonry mortars; and mortar recommendations. Illustrations of buildings are shown.

Ninth Safety Meeting of the Year at Pittsburgh, Penn.

With a Safety Enthusiast from Canada Officiating as Chairman of the Day

JACK DEMPSTER, peppy exponent of safety from the Canada Cement Co.'s plant at Port Colbourne, Ont., and editor of *Plantate News* and the *Cement Section News Letter,* opened the ninth regional safety meeting of the present series conducted by the Portland Cement Association, on April 17, at the William Penn hotel, Pittsburgh, Penn., and presided throughout the morning and afternoon sessions.

Represented at the Pittsburgh meeting were the Wampum, Penn., mill of the Cresent Portland Cement Co.; the Middle Branch, Ohio, mill of the Diamond Portland Cement Co.; the Buffalo mill of the Great Lakes Portland Cement Corp.; the New Castle, Penn., plant of the Lehigh Portland Cement Co.; the Zanesville, Ohio, plant of the Pittsburgh Plate Glass Co.; the Universal, Penn., plant of the Universal Atlas Cement Co.; the West Winfield, Penn., plant of the West Penn Cement Co., and the Port Colbourne plant of the Canada Cement Co. Present also were single representatives of the Pennsylvania-Dixie Cement Corp. and the Lawrence Portland Cement Co.

After reviewing the record made by the cement industry in 1930 with its favorable comparison over the year 1929, the feature subject of the morning session, a symposium, "How We Organized Our Plant to Win the Trophy," was opened by representatives from seven plants which maintained perfect safety records in 1930. This is by far the largest number of trophy winning mills to be represented at any of the regional safety meetings.

How Trophies Were Won

W. P. Rice, superintendent of the Crescent plant at Wampum, Penn., read one of the interesting papers on this subject, in which he said in part:

"We have done nothing particularly new or spectacular, nor can we attribute our success to the consequences of any one thing: but it is the result of the employes, from the highest to the lowest, being synchronized and fused into one body with one grand objective in mind—to co-operate and help each other put the safety idea across. . . We reach every man to make him understand the value of being alert to avoid accidents and that he is his brother's keeper. The responsibility in each department was delegated to the foreman. . . . Another point which we feel has been a decided factor in accident prevention, particularly in avoiding electrical hazards, is that all motors are started by one man who, with the mill operator, makes certain that everyone is in the clear and not liable to become entangled in moving machinery or screw conveyors. As a further protection, every man who is about to repair any machine must place a lock on the safety switch of the motor. W. M. Powell, our safety director, has been a great help not only in addressing meetings but in mingling with the the men until he can call them by name. In this way he has obtained their confidence and good will."

J. R. Kline, assistant superintendent of the Universal Atlas Cement Co., Universal, Penn., then was called upon to relate how his plant, the largest plant and number of man hours ever to win a safety trophy, accomplished this outstanding record. Mr. Kline stated:

"The assistant superintendent is in active charge of all mill operation and the promotion of safety is a part of operation. A weekly meeting is held with the heads of departments and leading foremen at which the record of the past period is gone into in detail; review of any special or investigating committees heard; discussion of any requests for changes or improvements in the interests of safety is entered into freely and accidents occurring outside the plant that would help us avoid similar accidents are described and discussed. This group constitutes the plant general safety committee.

"Each foreman in every department of the plant is instructed to hold group meetings of his men so that every man attends at least one safety meeting a month. A special group called safety officers, consisting of about one member for each 20 employes, appointed to the group for a year, meets one-third of the number each week, so all turns are represented each three weeks and discusses all phases of safety for the betterment of the plant.

"At all of these meetings mentioned min-

utes are kept and every safety suggestion is written up separately. If found practical it is immediately acted upon. If the suggestion requires further consideration it is presented at the next meeting of the general safety committee and disposed of there.

"Each spring and fall a special committee of five specially trained foremen is appointed and they thoroughly inspect the plant, paying particular attention to structures, machines, wiring, also reporting any general unsafe condition they might observe. This committee requires about a week to make a thorough inspection.

"For 1930, in addition to all the above, a group of five leading men or gang leaders from as many departments were appointed for a month to make an inspection of the plant, thoroughly study the company rule book and at end of the month make report specifically stating where any unsafe practices or violations of rules were noted.

"The basis of all safety work at this plant is that the foreman is responsible for all accidents. It is up to him to issue daily instructions to all his men regarding the safe method of working and then see that his instructions are carried out."

Others who spoke on the same general subject were: J. B. Zook (safety director, Great Lakes), Jack Dempster (storekeeper, Canada), Robert McAllister (superintendent, Pittsburgh Plate Glass), W. H. Kleckner (superintendent, Lehigh, New Castle) and T. M. Brown (Diamond).

A very enlightening discussion led by W. P. Rice was then entered into by several of the representatives present concerning the ground requirements on controllers and switch cases in modern cement plants. G. E. Clarkson, manager, Western Pennsylvania Safety Council, Pittsburgh, Penn., closed the morning session with an address, "Industrial Safety as I Know It."

R. L. Slocum, superintendent of the Universal Atlas plant at Universal, Penn., acted

A. J. Eales

Jack Dempster

as luncheon chairman, introducing L. M. McDonald, superintendent of the Canada Cement Co. plant at Port Colbourne, who spoke on "Qualifications for Success of Safety Engineers." Mr. McDonald's talk displayed his very intimate and accurate knowledge of the subject.

Afternoon Session

The afternoon session was opened with the reading of a paper prepared by A. J. Eales, safety director of the Bessemer Limestone and Cement Co. at Youngstown, Ohio, on the subject "The Importance of the Accident Report." Unfortunately Mr. Eales was unable to attend. Some of the high spots of his paper follow:

"First, the reporting of an accident is up to the man who receives the injury. He should report to his foreman, who should see that he receives first aid by sending the man to the first-aid room, when if in the opinion of the attendant the man requires medical treatment, he should be sent to a doctor.

"Secondly, it is up to the foreman to see that the men report all injuries to them and to see that they get the needed treatment. Then that day make out the proper report to the safety department or authorities having charge of the reporting to the state compensation board and other needed departments.

"The safety department cannot get reports without the co-operation of the foreman. He is the individual having direct contact with the men. To them he is the 'boss' who must get out a given product at the lowest possible cost, who must interpret the policy of the company to them, be interested in their welfare, etc. No man will report a minor injury unless he knows the foreman is interested in his welfare, and really cares for him as a human being and is not afraid to let him know it.

"When the foreman gets a new man, in addition to telling him what is required of him, he should inform him of the dangers connected with that job, show him how to guard against injury to himself and to others and what to do in case of an accident.

"I find many foremen are prone to make no record or report a case unless it is serious enough to warrant a loss of time. In other words, the average man does not think, he only feels, and it is only a serious injury that causes him to be interested in it, forgetting that every accident, no matter how slight, counts, and counts materially.

"As soon as the accident occurs, the foreman should get the man for treatment, then make an investigation and report the facts on a form usually provided. Copies of the report should be sent to the safety department and also to the department whose duty it is to complete the usual insurance company or state accident report forms, if this is not complied by the one department.

"If small forms suitable for the foreman's pocket are not provided, then he should enter a complete note of the same on his foreman's work book and later fill in a report at the office.

Doctor Bill Is Often the First Notice of an Accident

"It must be remembered that all medical treatment has to be paid for and too often the first news of a minor accident comes to the office in the form of a bill from the doctor for services rendered. If in the case of the doctor being on the company payroll, the safety department should check up frequently with the doctor's records to see if the plant has slipped up on reporting, or that the man

L. M. McDonald

himself has not reported to his foreman. In some communities they have only one doctor, and to the men he is the company doctor. A man will sometimes never mention an injury, particularly a strain or minor cut and then visit the doctor after work, and the plant will not be acquainted with the injury except through the doctor's records."

After a very interesting discussion on Mr. Eales' paper, J. B. Zook, safety director, Great Lakes Portland Cement Corp., read a paper on "Human Nature and the Safety Director," which was so good that it will be published in full in a later issue.

R. L. Blum

J. J. Forbes, chief engineer, U. S. Bureau of Mines, Pittsburgh, Penn., was then introduced and spoke on "First-Aid and Its Relationship to Safety."

Universal Atlas First-Aid Team Gives Demonstration

Following his talk an excellent demonstration of practical first-aid to the injured was enacted by a team from the Universal Atlas Cement Co. at Universal, Penn. The results of the work of this team were highly commended by those present.

At the banquet session, Toastmaster Jack Dempster introduced Paul Kuhn, assistant to the vice-president of the Penn Central Light and Power Co., Altoona, Penn. Mr. Kuhn is also director of safety and insurance of this large public utility company which recently won the Samuel Insull cup for the best safety record among 150 prominent public utility companies. Mr. Kuhn spoke on "The Practical Aspects of Organized Accident Prevention Work."

The meeting was considered a decided success by those who attended.

Safety Measures in Cement Rock Quarrying and Crushing

A COMPREHENSIVE ILLUSTRATED REPORT on cement rock quarrying and crushing has been drafted by Felix Guenther, Jr., general superintendent, Pennsylvania-Dixie Cement Corp., Kingsport, Tenn., and Stewart J. Owen, Jr., safety engineer, National Safety Council, Chicago, Ill. This report has been approved and published by the National Safety Council.

A number of the important preventative measures recommended are outlined in the following summary of the report. These are doubtless familiar to quarry operators, but a repetition of some of the high points will serve to give an idea of the comprehensiveness of the report. Copies may be obtained from the National Safety Council.

All stripping equipment should be kept in safe operating condition. This requires frequent examination of equipment. The top of the stone should be kept neat and orderly. Stripping operations should be a safe distance from the face of rock to be removed. Men scaling the face should use inspected and protected life lines.

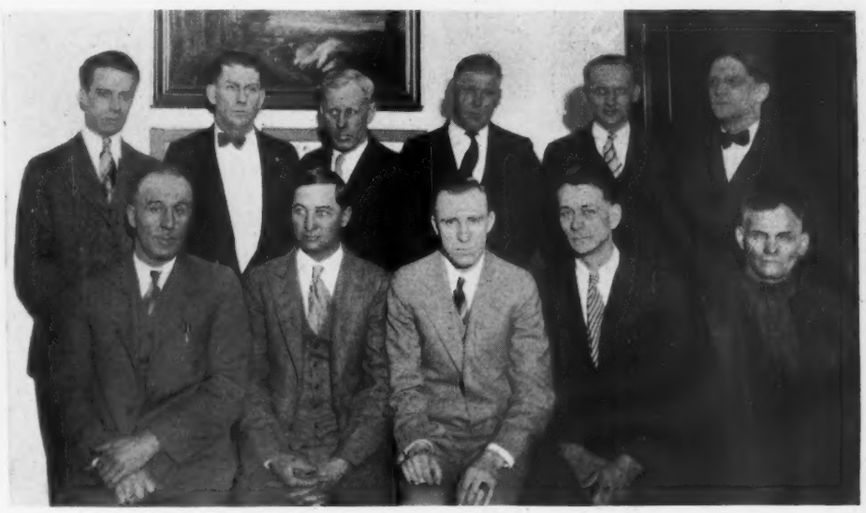
The most important requirement of drillers for safety is that they always pay close attention to the operation. This will avoid reaching for the wrong lever, raising the bit too high, allowing too much slack after resting the bit on floor, etc. Drillers should be constantly alert to the breaking of a bit in the shank or stem. Loose rocks must be pulled down in advance of the work. Presence of drillers must be kept in mind by blasters.

In blasting, all explosives magazines should be clean, dry, well ventilated and under lock and key. Only electric storage battery lanterns or flashlights should be permitted in a magazine for illumination. Explosives should never be stored in the same magazine with blasting caps or electric blasting caps. Packages of explosives should never be opened in the magazines. Explosives must be handled carefully. Vehicles for transporting them should be free from exposed nails, bolts and other metal parts. A separate box should be provided exclusively for carrying caps and fuse from magazine to the operation. A thawing kettle should be used when explosives must be thawed. Never use frozen explosives. Never use a knife or the teeth to crimp cap and fuse. When cordeau is used, avoid all sharp kinks. Matches and smoking should be prohibited from all parts of the blasting operation. Holes should be cleared of hanging stones before loading. The use of a pilot detonator and fuse is recommended when lighting a large number of fuses. Electric current for firing should be supplied by a blasting machine or power line of sufficient capacity. A distinctive warning signal should be sounded before firing. In primary blasting the quarry should be cleared of all men. When misfires occur, the leading wires should be disconnected from their source of electric energy, and the place where the shot failed to explode must not be visited for 30 minutes.

In digging and loading, the quarry floor should be kept clean. Shovel operators must keep in mind the safety of pit men and others. In moving electric powered shovels the power cable should be supported by workmen with rubber gloves.

In the transportation of materials, chocking of cars with wood or stone should be discouraged. Switch levers that operate parallel to the track must be used. Overloading and uneven loading of cars should be avoided. Tracks should be kept in good condition. The use of larger gyratory crushers or crushers served with feeders will do much toward eliminating crusher accidents.

[The recommendations contained in this report naturally need not be limited to application in cement rock quarrying. They should be given consideration by every quarry operator.—The Editors.]



Safety committee at the Osborn, Ohio, plant of the Wabash Portland Cement Co. Lester E. Palmer, works manager, appears at the right end of the back row

Portland Cement Output in April

THE PORTLAND cement industry in April, 1931, produced 11,245,000 bbl., shipped 11,184,000 bbl. from the mills, and had in stock at the end of the month 29,736,000 bbl. Production of portland cement in April, 1931, showed a decrease of 16.8% and shipments a decrease of 16.2%, as compared with April, 1930. Portland cement stocks at the mills were 3.7% lower than a year ago.

The statistics here presented are compiled from reports for April, received by the Bureau of Mines, from all manufacturing plants except four, for which estimates have been included in lieu of actual returns.

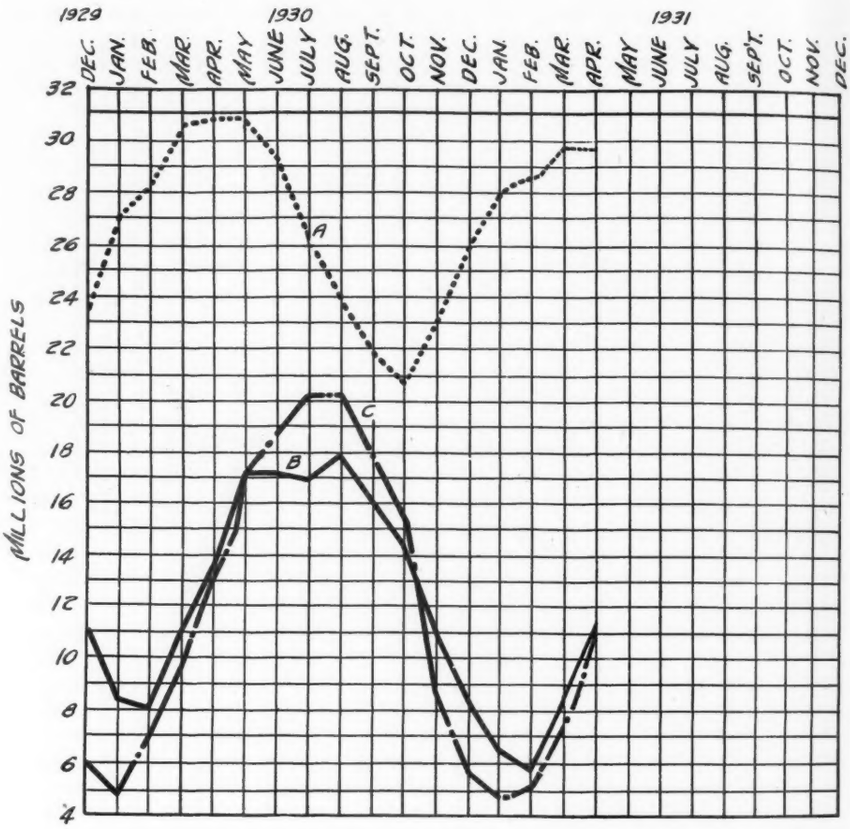
In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 165 plants both at the close of April, 1931, and of April, 1930. The estimates include increased capacity due to extensions and improvements during the period.

RELATION OF PRODUCTION TO CAPACITY

	Apr. 1930	Apr. 1931	Mar. 1931	Feb. 1931	Jan 1931
	Pct.	Pct.	Pct.	Pct.	Pct.
The month	64.0	52.1	36.9	29.4	29.5
12 months ended	66.0	57.7	58.6	59.7	60.6

Distribution of Cement

The following figures show shipments from portland cement mills distributed among the states to which cement was shipped during February and March, 1930 and 1931:


1929
1930
1931
DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
MILLIONS OF BARRELS
32 30 28 26 24 22 20 18 16 14 12 10 8 6 4
A
B
C

(A) Stocks of finished portland cement at factories; (B) Production of finished portland cement; (C) Shipments of finished portland cement from factories

PORTLAND CEMENT SHIPPED FROM MILLS INTO STATES IN FEBRUARY AND MARCH, 1930 AND 1931, IN BARRELS*

Shipped to	1930—February	1931	1930—March	1931
Alabama	135,425	103,610	104,750	175,601
Alaska	132	159	864	1,111
Arizona	35,218	36,834	44,917	53,821
Arkansas	80,512	43,685	86,481	74,368
California	695,831	532,384	†718,840	691,790
Colorado	43,570	32,603	57,317	42,724
Connecticut	60,197	40,716	109,085	82,833
Delaware	16,100	15,566	19,467	14,473
District of Columbia	48,482	56,388	70,893	76,232
Florida	82,931	60,601	87,400	49,466
Georgia	90,938	81,500	101,858	151,326
Hawaii	25,734	28,265	22,829	24,602
Idaho	9,943	7,472	18,305	16,408
Ilinois	356,200	227,023	379,453	279,580
Indiana	189,599	108,914	201,551	130,801
Iowa	111,155	73,262	117,907	121,769
Kansas	191,412	111,835	178,877	133,354
Kentucky	74,974	73,215	72,496	97,970
Louisiana	285,398	156,356	285,435	216,170
Maine	14,370	9,015	33,975	19,556
Maryland	101,896	71,391	172,822	103,592
Massachusetts	89,617	69,184	191,190	151,893
Michigan	258,450	170,815	344,412	200,479
Minnesota	111,059	62,726	91,055	106,842
Mississippi	48,264	31,532	56,606	29,594
Missouri	244,403	182,133	264,930	221,789
Montana	12,497	10,912	18,316	19,072
Nebraska	71,051	49,142	83,042	58,027
Nevada	8,306	6,231	11,923	9,804
New Hampshire	9,612	7,359	19,963	11,868
New Jersey	252,624	151,941	456,109	285,359
New Mexico	16,490	14,839	23,641	23,879
New York	663,031	622,266	1,095,878	1,035,782
North Carolina	75,768	42,771	101,751	92,639
North Dakota	10,070	5,790	20,791	17,176
Ohio	403,404	219,903	425,559	308,587
Oklahoma	234,569	125,682	283,365	136,628
Oregon	67,025	38,148	101,258	84,549
Pennsylvania	488,412	343,903	700,482	458,913
Porto Rico	1,750	1,020	2,125	2,672
Rhode Island	18,256	11,454	45,477	25,935
South Carolina	49,865	208,443	62,241	214,460
South Dakota	31,133	21,300	28,448	28,631
Tennessee	110,578	56,391	143,103	91,664
Texas	508,921	309,196	618,703	428,923
Utah	21,954	13,991	40,937	28,086
Vermont	14,964	2,014	23,132	7,389
Virginia	97,003	81,003	120,043	118,992
Washington	124,926	129,223	214,098	174,642
West Virginia	62,589	56,430	75,381	70,953
Wisconsin	140,053	85,088	159,096	119,628
Wyoming	6,225	5,333	9,934	8,585
Unspecified	17,732	63,233	40,274	16,947
	6,920,618	5,070,190	†8,758,785	7,147,934
Foreign countries	91,382	3,810	†67,215	44,066
Total shipped from cement plants	7,012,000	5,074,000	8,826,000	†7,192,000

*Includes estimated distribution of shipments from two plants in February and March, 1930; from four plants in February and March, 1931.
†Revised.

PRODUCTION AND STOCKS OF CLINKER BY MONTHS, IN 1930 AND 1931, IN BARRELS

Month	1930—Production	1931	Stocks at end of month 1930	1931
January	10,504,000	8,129,000	9,646,000	10,384,000
February	10,008,000	7,473,000	11,572,000	*11,946,000
March	13,045,000	*9,586,000	13,503,000	*13,318,000
April	15,025,000	11,540,000	15,164,000	13,701,000
May	16,607,000	.....	14,668,000	.....
June	15,895,000	.....	13,452,000	.....
July	15,069,000	.....	11,684,000	.....
August	15,244,000	.....	9,275,000	.....
September	14,577,000	.....	7,783,000	.....
October	13,895,000	.....	7,266,000	.....
November	11,639,000	.....	7,758,000	.....
December	9,484,000	.....	8,809,000	.....

*Revised.

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN APRIL, 1930 AND 1931, AND STOCKS IN MARCH, 1931, IN BARRELS

District	Production 1930—April—1931		Shipments 1930—April—1931		Stocks at end of month 1930	1931	Stocks at end of Mar., 1931*
Eastern Penn., N. J., Md.	3,067,000	2,691,000	3,127,000	2,587,000	7,037,000	6,725,000	6,622,000
New York and Maine	999,000	832,000	839,000	769,000	1,862,000	2,076,000	2,013,000
Ohio, Western Penn., W. Va.	1,458,000	829,000	1,375,000	919,000	3,965,000	3,476,000	3,565,000
Michigan	562,000	524,000	702,000	529,000	2,595,000	2,595,000	2,600,000
Wis., Ill., Ind. and Ky.	1,366,000	1,231,000	1,265,000	1,260,000	4,691,000	4,208,000	4,237,000
Va., Tenn., Ala., Ga., Fla., La.	1,262,000	1,268,000	1,239,000	1,343,000	1,751,000	1,639,000	1,714,000
East'n Mo., Ia., Minn., S. D.	1,415,000	1,261,000	1,230,000	1,029,000	4,049,000	4,064,000	3,833,000
Western Mo., Neb., Kansas, Okla. and Ark.	1,160,000	674,000	1,264,000	942,000	1,837,000	1,928,000	2,196,000
Texas	757,000	585,000	776,000	581,000	825,000	777,000	773,000
Colo., Mont., Utah, Wyo., Ida.	286,000	233,000	262,000	184,000	540,000	601,000	552,000
California	838,000	793,000	921,000	733,000	1,130,000	1,058,000	998,000
Oregon and Washington	351,000	324,000	340,000	308,000	585,000	589,000	573,000
	13,521,000	11,245,000	13,340,000	11,184,000	30,867,000	29,736,000	29,676,000

PRODUCTION, SHIPMENTS AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1930 AND 1931, IN BARRELS

Month	1930—Production—1931		1930—Shipments—1931		Stocks at end of month 1930	1931
January	8,498,000	6,595,000	4,955,000	4,692,000	27,081,000	27,759,000
February	8,162,000	5,920,000	7,012,000	5,074,000	28,249,000	*28,612,000
March	11,225,000	*8,245,000	8,826,000	*7,192,000	30,648,000	*29,676,000
April	13,521,000	11,245,000	13,340,000	11,184,000	30,867,000	29,736,000
May	17,249,000	.....	17,224,000	.....	30,891,000	.....
June	17,239,000	.....	18,781,000	.....	29,364,000	.....
July	17,078,000	.....	20,153,000	.....	26,289,000	.....
August	17,821,000	.....	20,299,000	.....	23,824,000	.....
September	16,124,000	.....	18,083,000	.....	21,889,000	.....
October	14,410,000	.....	15,599,000	.....	20,697,000	.....
November	11,098,000	.....	8,784,000	.....	23,056,000	.....
December	8,480,000	.....	5,688,000	.....	25,883,000	.....
	160,905,000	.....	158,744,000	.....	.....	.....

PRODUCTION AND STOCKS OF CLINKER (UNGROUND CEMENT), BY DISTRICTS, IN APRIL, 1930 AND 1931, IN BARRELS

District	1930—Production—1931		Stocks at end of month 1930	1931
Eastern Pennsylvania, New Jersey, Maryland	3,264,000	2,699,000	2,461,000	1,934,000
New York and Maine	1,081,000	979,000	1,081,000	1,470,000
Ohio, Western Pennsylvania, West Virginia	1,640,000	897,000	1,845,000	1,720,000
Michigan	907,000	486,000	2,053,000	1,820,000
Wisconsin, Illinois, Indiana and Kentucky	1,829,000	1,419,000	2,482,000	1,928,000
Virginia, Tennessee, Alabama, Georgia, Florida, Louisiana	1,335,000	1,238,000	964,000	865,000
Eastern Missouri, Iowa, Minnesota and South Dakota	1,547,000	1,256,000	1,158,000	1,021,000
Western Missouri, Nebraska, Kansas, Oklahoma, Arkansas	1,199,000	648,000	519,000	848,000
Texas	643,000	565,000	404,000	288,000
Colorado, Montana, Utah, Wyoming and Idaho	234,000	234,000	183,000	286,000
California	946,000	835,000	1,406,000	1,131,000
Oregon and Washington	400,000	284,000	608,000	390,000
	15,025,000	11,540,000	15,164,000	13,701,000

EXPORTS AND IMPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1930 AND 1931

Month	1930—Exports—1931 Barrels	Value	Barrels	Value	1930—Imports—1931§ Barrels	Value	Barrels	Value
January	82,387	$293,135	41,199	$115,678	201,609	$207,461	97,057	$132,937
February	64,267	217,798	25,703	88,989	114,455	119,717	22,370	26,250
March	117,563	357,896	54,599	144,579	43,622	59,981	70,532	80,686
April	57,419	200,217	.....	.....	140,871	178,226	.....	.....
May	57,423	198,170	.....	.....	94,696	111,998	.....	.....
June	82,077	223,639	.....	.....	55,356	74,370	.....	.....
July	47,082	166,577	.....	.....	12,404	20,973	.....	.....
August	49,031	167,579	.....	.....	35,323	39,029	.....	.....
September	46,594	153,384	.....	.....	51,096	59,721	.....	.....
October	62,690	190,305	.....	.....	75,284	84,364	.....	.....
November	50,495	151,555	.....	.....	109,124	125,448	.....	.....
December	38,680	134,260	.....	.....	44,157	59,641	.....	.....
	755,708	$2,454,515	.....	.....	977,997	$1,140,929	.....	.....

Exports and Imports†*

Compiled from the records of the Bureau of Foreign and Domestic Commerce and subject to revision.

EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES, IN MARCH, 1931

Exported to	Barrels	Value
Canada	1,943	$7,356
Central America	13,853	28,726
Cuba	6,319	15,269
Other West Indies and Bermuda	2,543	4,257
Mexico	2,986	11,716
South America	23,121	54,855
Other countries	3,834	22,400
	54,599	$144,579

IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES AND BY DISTRICTS, IN MARCH, 1931

Imported from	District into which imported	Barrels	Value
Belgium	New York	5,053	$4,215
	Porto Rico	1,006	1,850
	Total	6,059	$6,065
Denmark	New York	37,038	$43,852
	Porto Rico	18,519	21,430
	Total	55,557	$65,282
France‡	Los Angeles	154	$326
Japan	Hawaii	4,366	$4,607
Yugoslavia	New York	1,464	$1,252
	Philadelphia	2,932	3,154
	Total	4,396	$4,406
	Grand total‖	70,532	$80,686

DOMESTIC HYDRAULIC CEMENT SHIPPED TO ALASKA, HAWAII AND PORTO RICO, IN MARCH, 1931

	Barrels	Value
Alaska	247	$565
Hawaii	27,086	67,074
Porto Rico	2,660	2,634
	29,993	$70,273

*The value of exports of domestic cement is the actual cost at the time of exportation in the ports of the United States whence they are exported, as declared by the shippers on the export declarations.

†The value of imported cement represents the foreign market value at the time of exportation to the United States.

‡White nonstaining portland cement.

‖Includes 154 bbl. white nonstaining portland cement, valued at $326.

§Includes white nonstaining portland cement.

Retail Building Material Prices

THE figures given below, compiled by the Department of Commerce, show average prices paid April 1 by contractors delivered.

City	Portland cement, per bbl., exclu. of cont.	Gypsum wallboard, ⅜-in., per M	Hydrated lime, per ton	Building sand, per cu. yd.	Crushed stone, ¾-in., per ton	Gypsum plaster, neat, per ton
New Haven, Conn.	$2.90	.....	$20.00	$1.25	$2.25	.....
New London, Conn.	2.80	$25.00	18.00	1.50	3.00	$18.00
Waterbury, Conn.	3.00	30.00	20.00	1.25	2.45	20.00
Haverhill, Mass.	2.80	25.00	18.00	3.20	.....	18.50
New Bedford, Mass.	2.80	24.00	16.50	1.75	3.00	16.50
Albany, N. Y.	2.70	24.75	15.75	.....	.....	17.10
Buffalo, N. Y.	2.95	21.00	18.00	2.50	2.05	16.00
Poughkeepsie, N. Y.	2.18	.....	.....	2.25	2.00	.....
Rochester, N. Y.	2.85	22.00	20.00	1.75	2.40	16.00
Syracuse, N. Y.	2.55	25.00	13.00	2.00	1.70	15.00
Paterson, N. J.	2.40	25.00	18.00	1.50	2.10	17.50
Trenton, N. J.	1.94	25.00	18.00	1.15	1.80	17.50
Philadelphia, Penn.	2.30	.....	14.50	1.75	2.60	17.50
Scranton, Penn.	2.80	.....	20.00	3.25	.....	19.00
Baltimore, Md.	2.55	.....	13.00	2.25	2.50	15.50
Washington, D. C.	2.08	25.00	13.00	.....	.....	16.00
Richmond, Va.	3.10	31.00	17.50	1.95	2.45	20.00
Fairmont, W. Va.	2.80	35.00	16.00	3.15	3.50	18.00
Columbia, S. C.	2.32	35.00	12.50	1.50	2.75	15.40
Atlanta, Ga.	2.10	.....	15.00	2.50	2.75	19.00
Savannah, Ga.	2.25	25.00	20.00	2.00	.....	16.00
Tampa, Fla.	2.80	.....	24.00	2.75	.....	20.00
Shreveport, La.	3.20	.....	.....	2.00	3.80	22.00
Erie, Penn.	2.20	22.50	16.00	2.00	.....	16.00
Akron, Ohio	2.67	.....	18.00	1.85	.....	.....
Canton, Ohio	2.95	.....	16.00	2.50	3.00	15.00

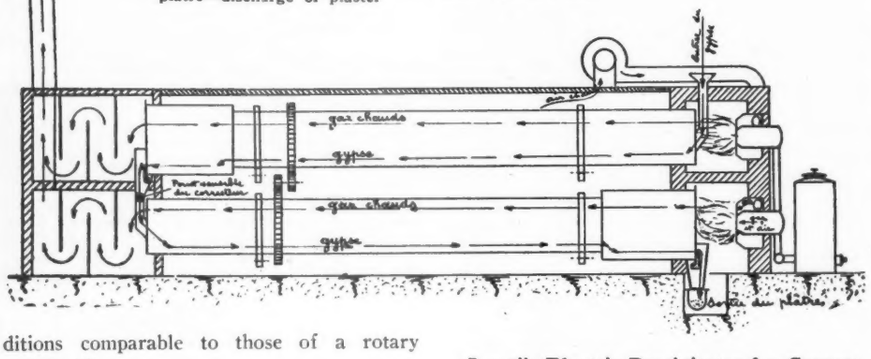
City	Portland cement, per bbl., exclu. of cont.	Gypsum wallboard, ⅜-in., per M	Hydrated lime, per ton	Building sand, per cu. yd.	Crushed stone, ¾-in., per ton	Gypsum plaster, neat, per ton
Cincinnati, Ohio	$2.30	$24.75	$14.40	$2.63	$2.55	.....
Cleveland, Ohio	1.85	.....	12.00	1.25	2.15	$15.00
Columbus, Ohio	2.35	.....	12.00	1.50	2.75	14.40
Toledo, Ohio	3.00	20.00	16.00	2.00	2.50	15.70
Youngstown, Ohio	2.95	.....	20.00	3.75	2.50	.....
Detroit, Mich.	2.60	25.00	14.80	2.03	1.95	16.00
Lansing, Mich.	2.15	.....	18.00	2.10	.....	16.00
Saginaw, Mich.	2.30	25.00	18.00	2.50	3.25	17.00
Terre Haute, Ind.	2.60	28.00	18.00	1.50	3.00	18.00
Louisville, Ky.	2.32	.....	15.50	2.20	2.43	17.00
Rockford, Ill.	2.80	25.00	20.00	1.60	1.15	16.00
Milwaukee, Wis.	.....	22.00	14.00	1.50	1.50	15.20
Des Moines, Iowa	.....	.....	20.00	1.02	.....	.....
Kansas City, Mo.	2.10	25.00	24.00	1.70	1.80	15.00
St. Louis, Mo.	2.15	.....	18.00	1.35	1.00	18.00
St. Paul, Minn.	2.45	.....	18.00	2.23	1.75	18.00
Grand Forks, N. D.	3.00	.....	25.00	2.60	.....	20.00
Sioux Falls, S. D.	2.40	.....	24.00	1.25	2.25	15.50
San Antonio, Texas	2.60	.....	20.00	2.25	2.35	19.15
Tucson, Ariz.	3.37	36.00	30.00	1.25	2.25	17.50
Denver, Colo.	2.20	35.00	22.00	1.35	1.50	18.00
Los Angeles, Calif.	2.30	.....	24.70	1.85	1.90	15.20
San Francisco, Calif.	2.60	.....	22.50	1.40	1.60	16.90
Seattle, Wash.	1.60	.....	22.00	1.50	1.90	20.00
Portland, Ore.	1.75	.....	22.00	1.30	1.90	20.00

Foreign Abstracts and Patent Review

A Double Rotary Kiln for Burning Plaster. P. Dumesnil states that a plaster kiln of unique design has been developed at the Vallee-Bourdet Works at Triel, Seine-et-Oise. An installation of this development is in operation in a plaster plant near Paris. This kiln operates with direct contact between the gypsum and the hot gases. Its design produces a new thermic cycle, known economic results, and makes it possible to obtain the desired qualities of plaster by modifying the temperatures at certain points in the cycle of burning. The system is continuous and operates under mechanical conditions comparable to those of a rotary cement kiln.

Section of the double rotary gypsum kiln

Gaz chauds—hot gases; gypse, gypsum; air chauds—hot air; enree du gypse—entrance of gypsum; vapeurs—vapors; points sensible du correction—correction point for gypsum; gaz et air—gas and air; sortie du platre—discharge of plaster



The kiln consists essentially of two burning tubes generally superposed, which are traversed once by the gypsum to be burned and once by the hot gases supplied from an outside source conveniently located. The material is introduced as pulverized gypsum in the upper tube where the temperature is highest, traveling in the same direction as the gas. It then passes into the second tube, at the lowest temperature, in which it travels in inverse direction to the gas. The gypsum is mixed continuously while it passes through the kilns by the rotation of the tubes. This facilitates movement of the material and the transfer of the heat to it.

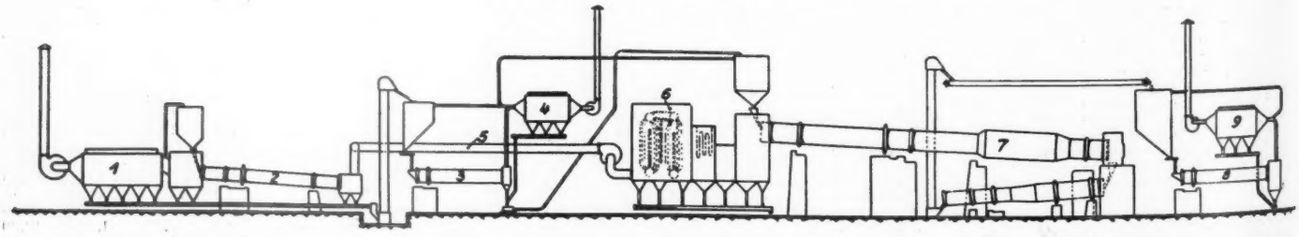
Two special fans remove the vapors produced in the burn, one being installed at the end of each tube, in the two dust chambers. In each tube head is installed a heat delivery nozzle. These nozzles are regulated independently of each other. The charge can be adjusted by voluntary regulation of the feed and at the same time by means of a retaining arrangement at the discharge end of each tube. There is no danger of overburning the gypsum, for the hottest gases are effective where the material still contains its free and crystallized water. The quarried gypsum is ground to pass through a 20-mesh per cm. (8-mesh) screen before charging, which facilitates and improves burning. Most grades of plaster can be produced due to the easy and extensive control of the kiln.—*Revue des Materiaux de Construction et de Travaux Publics* (1930), 250, pp. 271-273.

Lurgi's Electric Precipitator for Cement Plants. The process of electric purification of gas based upon the basic patents of Cottrell (an American) and Moeller (a German) were introduced in Germany in 1913 by the Lurgi Co. and developed by it. This equipment is applicable for purification of waste gases from wet and dry process rotary kilns, shaft kilns, drying drums for raw materials with direct firing or waste-gas firing, pit coal drying plants, exhaust air from cement mills, silos, conveying equipment such as bucket elevators, spiral conveyors, vibrating conveyors, etc.

In wet-process rotary kiln plants the direct electric purification of waste gases effects reclaiming of dust to the amount of 3 to 5% based upon the clinker production of the kilns; and the output of the kilns can be increased more than 20% without causing dust nuisance in the neighborhood. In dry-process rotary kiln plants the waste gas is passed through waste-heat boilers and raw material driers and then purified electrically, in which process 1260 B.t.u. per lb. of clinker and 20 to 30 tons of dust are reclaimed, based on a clinker output of 200 tons a day. Many very desirable advantages are derived from an electric precipitating plant serving various sections of the cement plant. A drawing shows the arrangement of electrical precipitation in a modern cement plant.—*From a Leaflet by the Lurgi Co.*

Limestone in Relation to Limes. In concluding a series of articles on this subject, Max Pulfrich states that in addition to the chemical composition of limestones, especially the granular structure, the texture, the crystal condition and the density have influence upon the behavior of the burn and under certain conditions also upon behavior in slaking. In order to be able to select a kind of raw material to suit the quality of a certain lime to be made, an exact knowledge of limestones is necessary from the chemical, physical and crystallographic viewpoints. The data presented deals with German limestones and limes.—*Tonindustrie-Zeitung* (1931) **55**, 18, pp. 259-260.

Determination of Alkalies. Curt Pruessing offers as a contribution to the proposed German Procedure for Analysis of Specification Cement some conclusions drawn from experimenting with the Lawrence Smith method of alkali determination. According to the results, it appears important to determine the temperature exactly at which the evaporation of the alkali starts, and to determine if the evaporation temperature is lowered by the presence of ammonium chloride. When a temperature of 500 deg. C. is reached marked losses in evaporation of the alkali mixture set in.—*Zement* (1931) **20**, 16, p. 360.



Arrangement of electric precipitators in a modern cement plant, showing electric filter (1), waste gas-fired raw material drier (2), raw material mill with accessory electric filter (3) and (4), waste gas line (5) between boiler and drier, waste heat boiler (6), rotary kiln (7), cement mill (8) and (9) with accessory electric filter

Criticism of Research of Tricalcium Silicate. E. Jaenecke has studied an article by Brownmiller and Bogue entitled "The X-ray Method Applied to a Study of the Constitution of Portland Cement," by the Bureau of Standards, Washington, D. C., and concludes from a criticism of the work and of his own work that the problem of the constitution of the portland cements cannot be completely decided even by the fine investigations of Brownmiller and Bogue, and that the contradications which for the present appear not solvable must be cleared through new investigations.—*Zement* (1931) 20, 2, p. 26.

Analysis of Limestone Deposits and Lime. Max Pulfrich presented a paper before the general meeting of the Association of German Lime Plants at Cologne on May 27, 1930, in which he gives first the results of his detailed examinations of the chemical and physical character of limestone from 14 different European deposits, which indicate the great diversity in chemical composition and coloring. He then gives the results of his detailed examination of the influence of this diversity in limestone upon the qualities of the quicklime and slaked lime produced from these different deposits, which was done by burning the various limestones under practically identical conditions at a common burning temperature of 1000 and 1100 deg. C. The comparisons between the various deposits and the limes produced from them, which can be made from the exhaustive tables, diagrams and illustrations presented by the author, may be of interest for making similar studies of other limestone deposits and their products.—*Tonindustrie-Zeitung* (1931) **55**, Nos. 11, 13, 14.

Recent Process Patents

The following brief abstracts are of current process patents issued by the U. S. Patent Office, Washington, D. C. Complete copies may be obtained by sending 10c to the Commissioner of Patents, Washington, D. C., for each patent desired.

Sand and Gravel Washing Device. A recently patented sand and gravel washer has a plurality of flow tables, screens inclined against the flow of the material and a settling tank for recovering the sand with discharge overflow to carry off dirty water.

This is one of those patents which mystify one who is acquainted with the sand and gravel industry. The combination of flow tables, screens of the type shown and a sand-settling tank has been in use for many years and in many parts of the United States. The reviewer can find nothing novel in either the units employed or their combination.—*H. G. Young, U. S. Patent No.* 1,704,115.

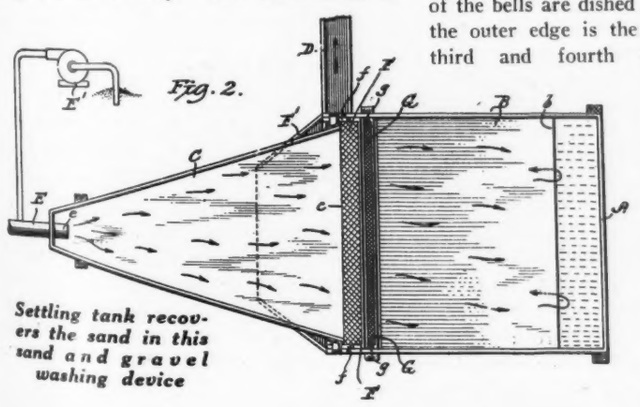
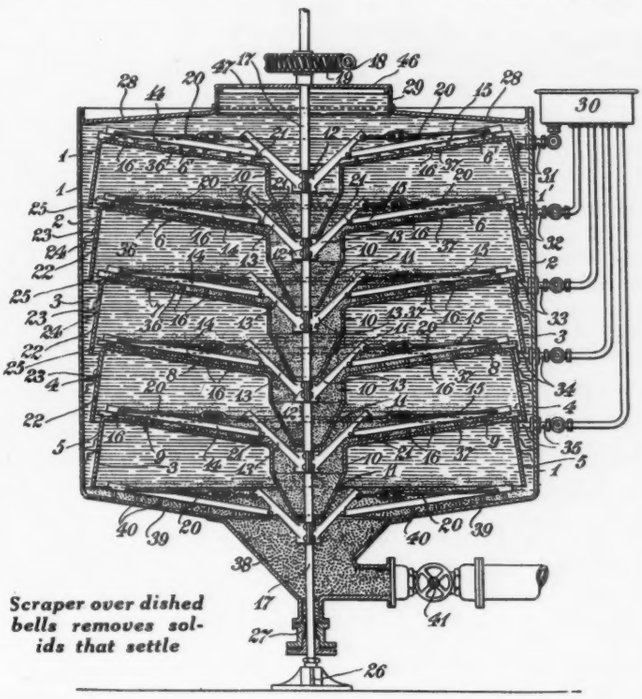


Fig. 2.

Settling tank recovers the sand in this sand and gravel washing device

Method of Thickening. The method of thickening as a mixture of a liquid and light solids in suspension shown here employs a tank in which are a number of bells. These are placed so that the edges of each bell overlaps the top of the bell below. The tops of the bells are dished and a scraper moving over them removes solids that settle and carry them to a central passage made of conical vessels attached to the bells.



Scraper over dished bells removes solids that settle

The feed is admitted at the top and flows into the bells at the center. The solids that settle are carried inwardly while the clear liquid rises and is taken off through pipes placed in the highest part of the bells. The settled solids are removed at the bottom.

Four forms of this thickener are shown in the patent, only the first being illustrated here. In the second and third forms the tops of the bells are dished the other way so that the outer edge is the lowest part. In the third and fourth forms the scrapers push the settled solids to the outside of the bells so that it does not have to pass the entering feed of raw liquid. In these forms the clear liquid is removed from a high point near the center of the bell.—*J. W. Wicks, United States Patent No.* 1,754,870.

Cellular Siliceous Building Material. This invention covers a cellular building material having no organic ingredients but consisting of sand, clay or other similar material combined with portland cement and with aluminum powder added as the gas-forming chemical. After drying the cast, it is baked at 200 to 1300 deg. C. An insulating material results of mechanical strength equal to ordinary baked ceramic products.—*Louis Desmarquest, U. S. Patent No.* 1,761,-108.

Dust Collection. A new form of dust collector employs a "cartridge" with a shell of coarse screening. The interior is filled with metal turnings or with similar finely divided noncombustible material. The smoke or gas from a furnace, for example, is passed through this cartridge and solids are deposited in the mass of metal turnings because of the passing of the current through so many tortuous passages. As the openings in the mass of turnings are relatively large, the resistance to the passage of the draft is not great. When a cartridge is loaded with solids it may be removed and a clean cartridge substituted.

There is an analogy to a kind of water clarifier in this device. The water clarifier employs a system of cells filled with excelsior through which muddy water is passed. The greater part of the mud settles on the excelsior. The device described here seems to have been invented for application to small furnace units but perhaps has a wide application.—*C. T. Cabrera, U. S. Patent No.* 1,774,504.

Manufacture of Portland Cement. The invention comprises a method of burning portland cement whereby the burning is accomplished without injuriously affecting the chemical characteristics of the clinker and at the same time preventing the semi-molten mass from adhering to the kiln lining. The patentee proposes to mix sodium chloride with the fuel, thus subjecting the clinker to the blast of flame having salt as a part of the flame. He maintains that cement clinker formed in this manner will not adhere to the kiln lining and that the salt does not contaminate the cement. He recommends 40 lb. of salt per ton of fuel. Such a procedure will also remove a pre-existing clinker ring, according to the inventor.—*Geo. A. Walter, U. S. Patent No.* 1,770,958.

Ed. Shaw's News Letter From Los Angeles

I HEARD THE other day of a really serious study that is being made to see if portland cement can be made by a new type of electric furnace. Of course such a thing has been thought of many times, and the making of fused alumina cements in electric furnaces is an established industry. But portland cement making is a different story as it requires more heat units and the product sells for a lower price.

Portland Cement by Electric Furnace?

This was well understood, but, it was pointed out to me there are localities where hydro-electric installations and other large constructions have to be built that are far from cement mills and near sources of abundant electric power and cement raw materials. Under such conditions it is thought it might pay the contractor to put up an electric furnace and make his own cement. The higher cost of heat units would be offset by his having no freight and no sales expense to pay and a less plant installation cost, assuming that he could salvage part of his equipment. The site of Boulder dam, or I should say Hoover dam, is said to be such a locality, although I did not see any figures that would prove it. I do not know about this particular site, but after spending some hours with a slide rule, a hand book, Dr. Martin's articles and some other articles in Rock Products, I am inclined to think that cement-making localities that would offer opportunity to the electric furnace may exist.

Possibilities of "Blended" Cements

I do not know whether the dam is to be built of blended cement, as was the Los Angeles aqueduct, and as some other reclamation service jobs have been, or not. If blended cement could be used, it would rather knock the underpinning out of any scheme to make cement in an electric furnace. And blended cements are not experimental. The Monolith Portland Cement Co., of this city, has been making one for some time at its plant at Monolith, about 125 miles north. It is a fifty-fifty mixture of straight portland cement (not this company's waterproof cement) and a pumice which it digs in its own "back yard," so to speak. W. S. Trueblood, the production manager of the Monolith company, told me the pumice closely resembles the trass which has been so much used in European cements. The new cement has already been accepted in some towns and cities here for public works and it is said contractors like it because of its plastic qualities. Other contractors, of the sort which are still altogether too many, may object to it because it will not do to "skin the cement" on any job in which it is used. The cement has been sufficiently "skun" in the process of manufacture.

Probably there is a place for such cements; the fact that they are steadily used in European countries would indicate that. But neither there nor here have they displaced portland cement to any great extent. They used to be made in this country in larger amount than at present.

Hard Times Develop Ingenuity

It is during such times as the present that new ideas flourish, for when men cannot devote themselves wholly to business they will use their energies in invention and discovery and trying new ways of doing things. Probably this is for the best. If we were to have a Utopia it would fail because there would be no hard times. We need rough going once in a while to strengthen our muscles and our brains.

Also such times are necessary to cure us of wanting to do big things merely because they are big, and to give us a saner view of our work. There is a good example of this in a controversy that is agitating engineering circles here at the present moment over the aqueduct which is to bring the water from the Hoover dam down to this part of the country.

A New Los Angeles Aqueduct

The plan proposed by the Weymouth and Sonderregger reports calls for an aqueduct to bring in 1500 sec. ft. estimated to cost $234,900,000, with its terminals and distribution lines. This is about five times what it is estimated the dam itself will cost. John Treanor (president of the Riverside Portland Cement Co.) has attacked this plan. He shows that, taking the same figures of population increase that the engineers have taken, there will be no need of so large an aqueduct for at least 12 years. He also shows that one that will convey 500 sec. ft. can be built on a shorter route than the proposed Parker route for $50,000,000. Built on the same route, a 500-sec. ft. aqueduct could be built for half the cost of a 1500-sec. ft. aqueduct. If, at the end of 15 or 20 years, the $50,000,000 aqueduct was found to be too small, the saving in interest alone would be enough to build any kind of an aqueduct that was needed. The argument seems sound.

Some Dam Details

Brownell McGrew, just back from the dam site when I called on him the other day, was full of facts and figures about the work. It *is* an amazing job, even to a public that is blasé and bored with hearing of 1000-ft. tall buildings and suspension bridges with three times that span. He had a copy of the specifications with him, a good sized book beautifully printed and illustrated. Until I studied the sections and thought about them, I had no real idea of what a tremendous mass of concrete it will be, 720 ft. high and almost 600 ft. thick at the base. A tunnel in the base would be as long as a Chicago block or two or three New York City blocks. I wish there were a chance for the order for all that aggregate to be spread around to some plants that are running half time or are idle altogether, but the strongest argument for concrete as a construction material is that the aggregates can usually be produced locally. The maximum size of the aggregate, by the way, is 8-in. diameter.

The contractors have to put up a plant to produce not only the aggregates required by the schedule but a surplus such that nearly 4,000,000 cu. yd. will be on hand about two years before the work is finished, when the pit will be flooded. It makes a nice problem in business engineering to figure out not only the rate of production but the type of plant that will do the work, including what must be written off for loss of equipment.

Looking over the specifications, it was easy to see that it is not only the rock products industry that will benefit. All sorts of machinery and material will be needed, not only for the work but to care for the men. One interesting item is 150 miles of 2-in. pipe which will be placed in the concrete to cool it while setting and hardening.

Crushed Gypsum Is Held Admissible Without Duty

PLASTER ROCK or gypsum which, after being quarried, is put through a crusher before exportation for convenience in transportation, is not ground or otherwise manufactured, the United States Customs Court at New York City finds in denying a tariff protest of the Gulf Gypsum Co. to have this commodity removed from the free list to the dutiable list.

The collector's action in allowing this gypsum to come into the country duty free as crude gypsum is affirmed by the court in an opinion by Judge McClelland.

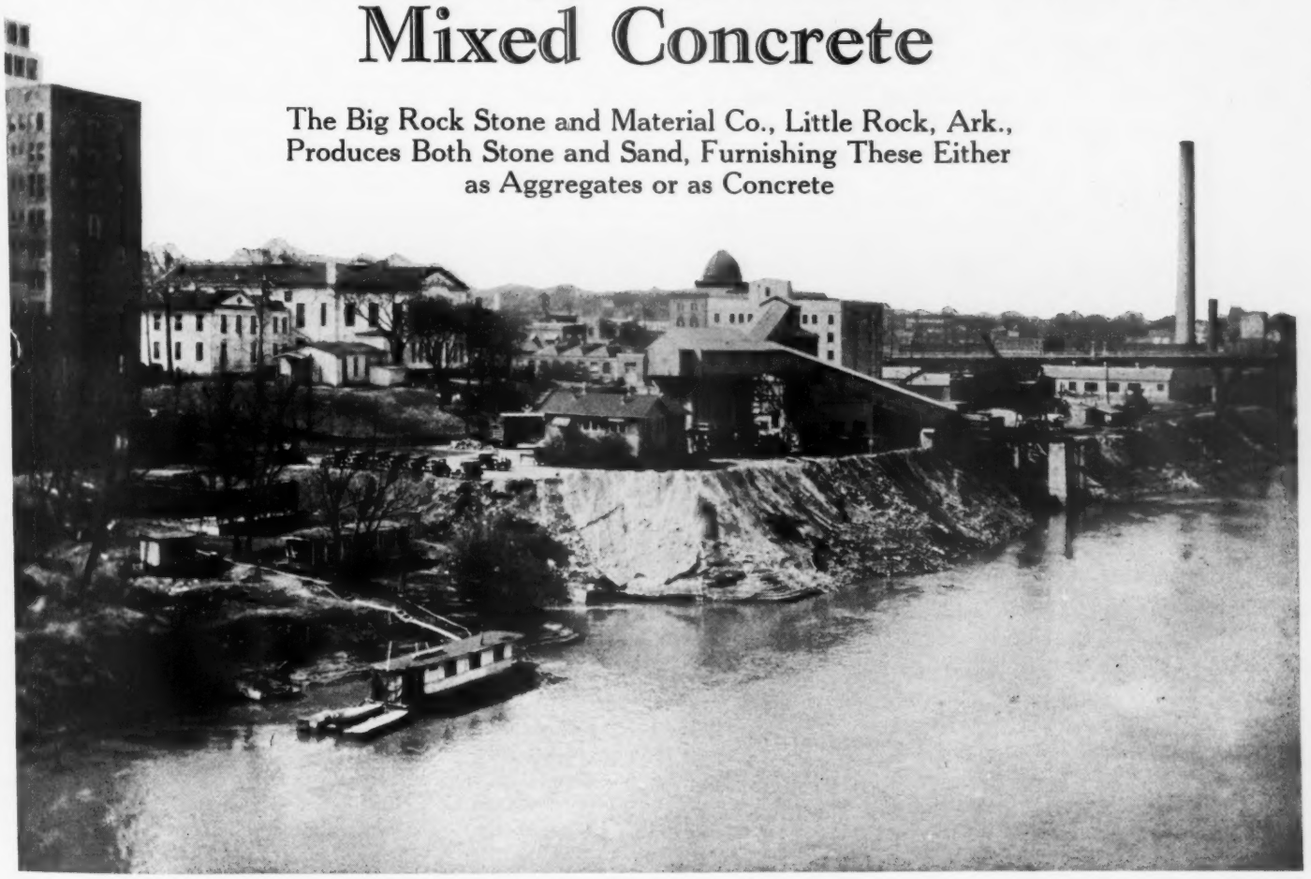
The domestic producers claimed duty at $1.40 per ton, under paragraph 205; 30% ad valorem, under paragraph 214, or 10 or 20% ad valorem, under paragraph 1459, act of 1922. The collector's action, in allowing free entry, under paragraph 1643 of the 1922 law is upheld.—(Protest 385216-G-48616.)

Cement Products

TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Marketing Aggregates as Ready-Mixed Concrete

The Big Rock Stone and Material Co., Little Rock, Ark., Produces Both Stone and Sand, Furnishing These Either as Aggregates or as Concrete



Centrally located plant of Big Rock Stone and Material Co., Little Rock, Ark.

A GOOD EXAMPLE of the increasingly successful marketing of aggregates by the producer in the form of ready-mixed concrete is afforded by the Big Rock Stone and Material Co. at Little Rock, Ark.

Here this company furnishes from a single centrally located retail plant either stone or sand or both from a set of dry batching bins, and at the same point operates a central-mixing plant for the manufacture of concrete. While not as large as some others in more thickly populated centers, this retail yard and ready-mixed plant gives the impression of a well organized and efficient operation.

This company is understood to have been the second, at least in this part of the country, to go into the field of commercial ready-mixed concrete, the original plant having been built in 1926, and the present plant in 1928. As dates go in this new industry, that is a good record.

As a result of the confidence established in this method of making concrete more than 90% of the total concrete used in the city, aside from paving work, is produced by this plant, and a number of the architects are voluntarily specifying ready-mixed concrete on a strength basis, based on their own experience with it.

The stone used as coarse aggregate is produced at the company's plant near the city, while the sand is dredged by the company from the river and barged to the mixing plant, thus assuring control of the raw materials.

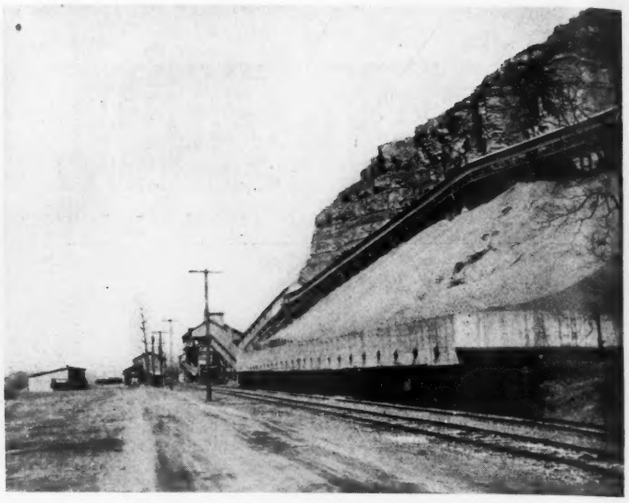
Central Mixing Plant

The concrete plant, which has a capacity of about 400 cu. yd. per day, with an output of around 40,000 cu. yd. annually, is located along the river at the foot of Ashley street in the downtown section.

Here the stone in railway cars and the sand in barges are unloaded to separate stockpiles and to the plant by a steam operated crane with clamshell bucket.

The crane handles either material to a hopper feeding a 24-in. inclined belt conveyor carrying up over the dry batching bins, where a tripper delivers it to these bins or to a second 24-in. inclined conveyor to the top of the bins over the concrete mixing plant. Here a turnspout puts the material into one of three bins, one for regular

Quarry with 200-ft. face



Storage piles and crushing plant

coarse aggregate, one for special coarse aggregate and one for sand.

The dry-batching bins have five bin gates below and five volume batchers alongside for truck loading of dry aggregate material.

Cement for the concrete plant is received by rail in bags and unloaded either to the warehouse or to an elevator which carries the bags up to the floor above the mixer. Several different brands of cement are handled to meet the customers' preferences.

The proportioning of the stone and sand is by volume, using ingeniously worked out volume batchers of the company's own design, based on accurate determinations as to grading and moisture content of the particular materials used. The cement content of the batch is by bag.

Each of the two batchers consists of a steel box, square as to cross section, with a movable bottom, counterweighted for ease of movement, which has connected with it an indicator or pointer traveling in guides on the front to show the exact position of the bottom. The front of the batcher is also marked with cross lines to indicate the required position of the bottom for any mix and size of batch. In this manner the bottom is easily moved and set to give any required quantity of aggregate, then being filled from the bin above by a gate.

The markings on the stone batcher are located according to the quantity of stone required for any batch, and those on the sand batcher, according to the quantity of sand required, this calibration having been carefully determined, so that it is only necessary to move the bottoms and their pointers to match the cross lines for the particular batch.

The movable bottom consists of a trip door for discharging the material to the mixer hopper.

The cement sacks are emptied into a cement hopper with trip door, also feeding to the mixer, the empty sacks being returned down a chute to the warehouse.

Thus the proportioning of the batch is done in this way on the floor above the mixer, according to the information signaled from the plant office. The method of signaling this information is quite interesting and will be described farther on.

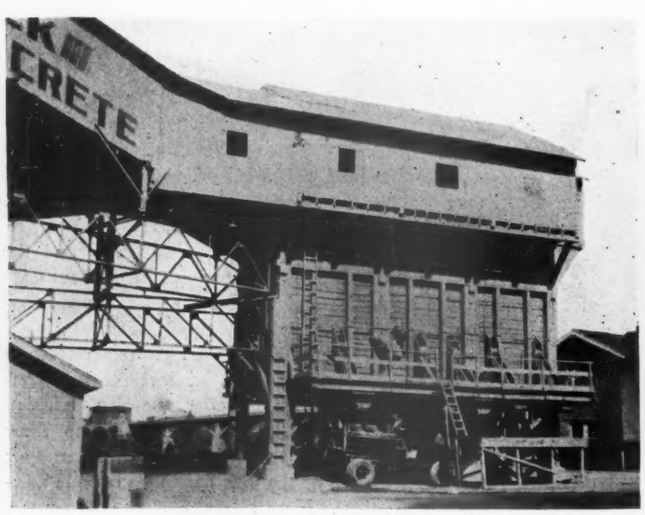
A 2-yd. Ransome mixer with a direct-connected motor is used, and except in special cases the concrete is mixed for two minutes before discharging it to the trucks.

The water tank is of the type which is filled and overflowed for each batch, with a gage calibrated to show gallons as indicated in one of the pictures. The tank is then emptied to the required point. About half of the water is admitted to the mixer ahead of the batch to reduce dust loss and assist in keeping the mixer clean.

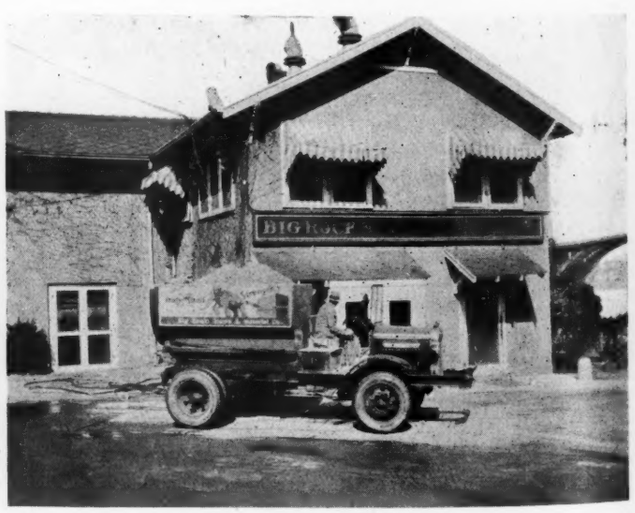
Signaling System

The signaling system used to transmit orders from the office to the batching platform as to quantities required for each batch is interesting and ingenious. It consists of a signal board on the batching floor above the mixer with electric lamps for each mix and size batch, this being operated from a corresponding board with switches located in the office.

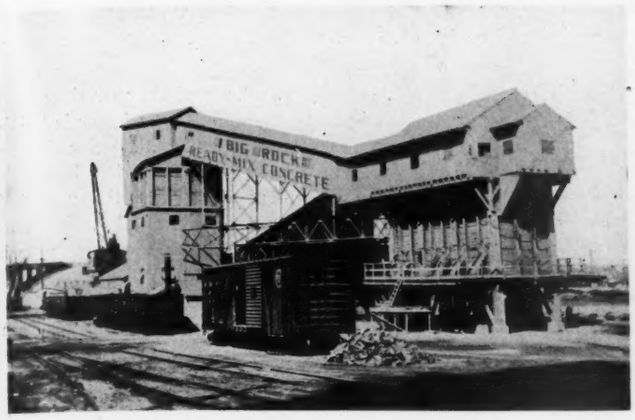
Six different mixes, 1:2:3, 1:2½:4,



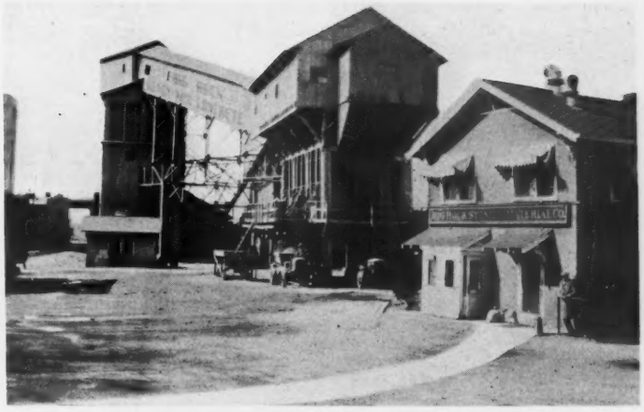
Side view of dry-batching bins



Office, with load of sand on scales



Ready-mix plant at left and dry-batching bins at right



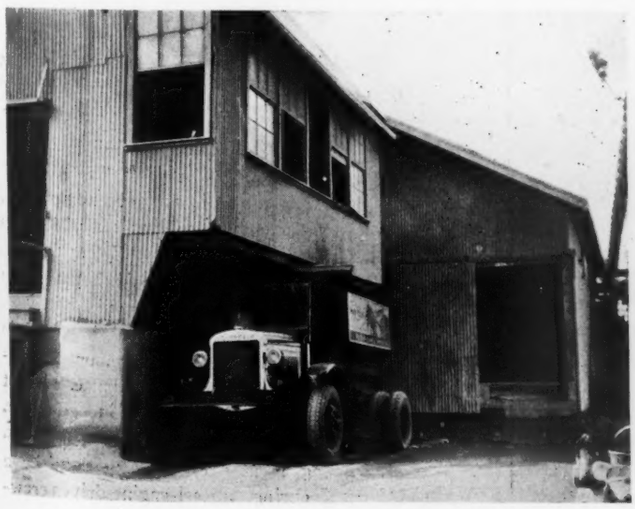
Dry-batching bins in center, office at right

1:2:4, 1:3:6, 1:3:5 and 1:2½:5, are indicated for each size of batch, and eight different batch sizes, namely, ¼, ½, ¾, 1, 1¼, 1½, 1¾ and 2 yd. To cover these various quantities and conditions 56 lamps are used, 48 for the six different mixes and eight batch sizes, and the others for special instructions as to admixtures, kind of cement or other special mixes.

Thus throwing in any one of the switches on the office board lights the corresponding lamp on the board on the batching floor and indicates to the operator the characteristics of the required batch. The markings on the batchers permit of setting them without any further calculation to correspond with the marking on the signal board. At the right of the signal lamp is shown in each case the required number of sacks of cement so that the cement man takes care of the cement while the aggregates are being batched. One to three men are required on the batching floor, depending upon how rapidly concrete is being turned out.

A similar signal board located on the floor below and just above the mixer indicates the batch to the mixer operator. This board has the batcher markings and the signal lamps and also has a pointer which is con-

One of the 2-yd. bath tub type trucks, used for either dry material or concrete



Two views of truck being loaded from concrete mixer

nected with the stone aggregate batcher and thus verifies to the mixer man that the batcher has been properly set.

General

The concrete is delivered in the company's own trucks, ten 2-yd. Wood bath-tub bodies on Hug trucks being used for this purpose. With the low slump concrete usually furnished, the company has not found agitator bodies necessary, even though hauls have been made up to 22 miles.

Slump tests are made and test cylinders taken at the job, all testing work being done by the Van Trump Laboratories, and records are kept.

Sale Price

Concrete of 2000-lb. strength is sold at $6.50 per cu. yd. at the plant, and other strengths in proportion, with an additional charge of 50 c. for each mile of delivery except on long hauls calling for special arrangements. A spread of $1 per cu. yd. is figured over the delivered price of the corresponding dry materials.

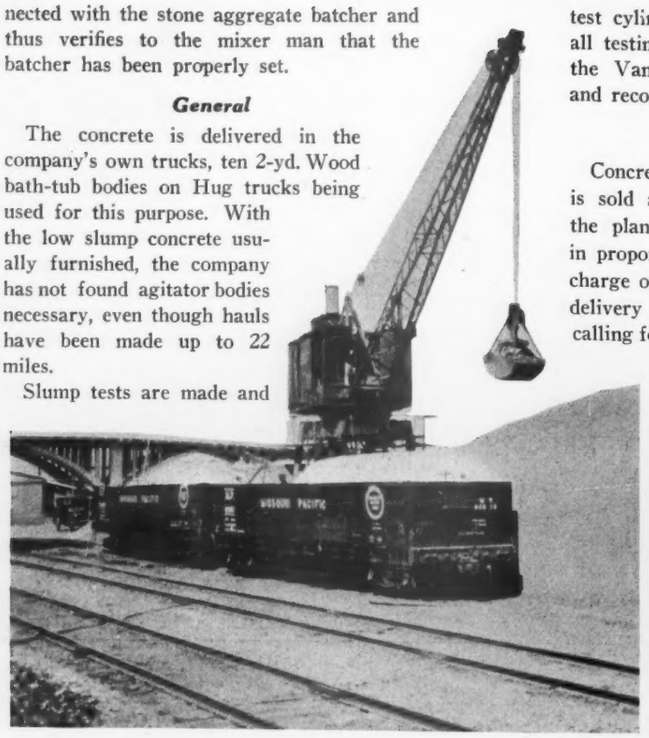
One of the features of the operation which has undoubtedly been a large factor in building up confidence and satisfaction in the product is the policy which has been followed of co-operating with the user and keeping in touch with the job to see that the concrete is properly delivered and placed.

Stone Plant

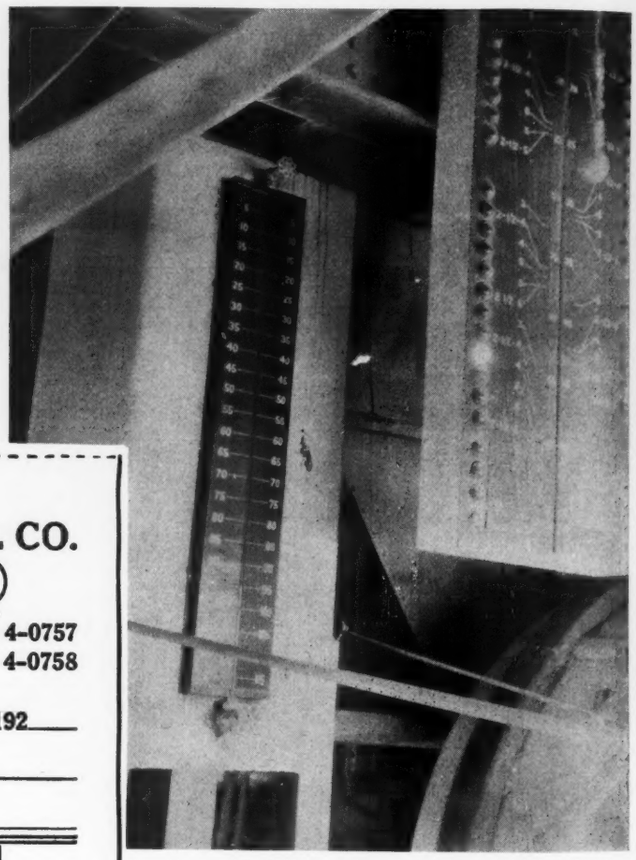
The stone-crushing plant, which has been previously described in Rock Products, has a capacity of about 2500 tons per day and an output of around 500,000 tons a year. About 20% of this goes to the city retail plant for concrete and for dry aggregates.

The stone, which is an exceedingly hard quartzite, difficult to crush, is quarried from a face about 200 ft. high. "Cyclone" well-drill rigs are used, making 8-in. holes, which are spaced about 20 ft. apart and 26 ft. back from the face, this size hole being used in order to get the necessary amount of explosive in a given vertical distance. About 2000-lb. of dynamite is used in each hole, which brings down about 10,000 tons of rock.

Stripping is at present being done by a 1½-yd. Koehring, Diesel-engine-driven crawler type shovel, loading to trucks.



Crane used in handling stone and sand from cars and barges to storage, and from storage to plant hopper



At mixer platform, with water tank and gage at left and batch signal board at right

DUPLICATE

RECEIVED FROM

BIG ROCK STONE & MATERIAL CO.

PRODUCERS OF

READY MIXED CONCRETE

Offices Foot of Ashley St. Phone 4-0757

Plant, Foot of Ashley St. " 4-0758

Date_____ 192___

For_____

At_____

	Cu. Yds. Concrete		
	Mixture		
	Dry Batch		
	Mixture.		
	Sacks Cement		

Truck No._____ No. 45702

Driver_____

295173 BUSINESS UARCO SYSTEMS, CHICAGO

Duplicate ticket given to customer—actual size

A 3-yd. 100-B Bucyrus electric shovel loads the rock to trains of 4-yd. contractors' type, side-dump cars for the crusher.

Two 10-in. Newhouse crushers have been added for recrushing work, replacing a number of small gyratory crushers.

One 7-in. Newhouse crusher is also used on some of the recrushing from storage.

A large storage pile formed by a belt conveyor above and with a tunnel and reclaiming belt conveyor below is used for carrying over the winter period.

The conveyor gallery over this pile is interesting in that it is in part supported from the rock face on one side as shown in one of the accompanying pictures.

The material larger than 1¼-in. is sized in revolving screens, and four Allis-Chalmers vibrating screens have been added to size the minus 1¼-in. material. These screens are arranged in two rows with two in tandem and are equipped with ¾-in., ½-in. and ¼-in. mesh wire cloth.

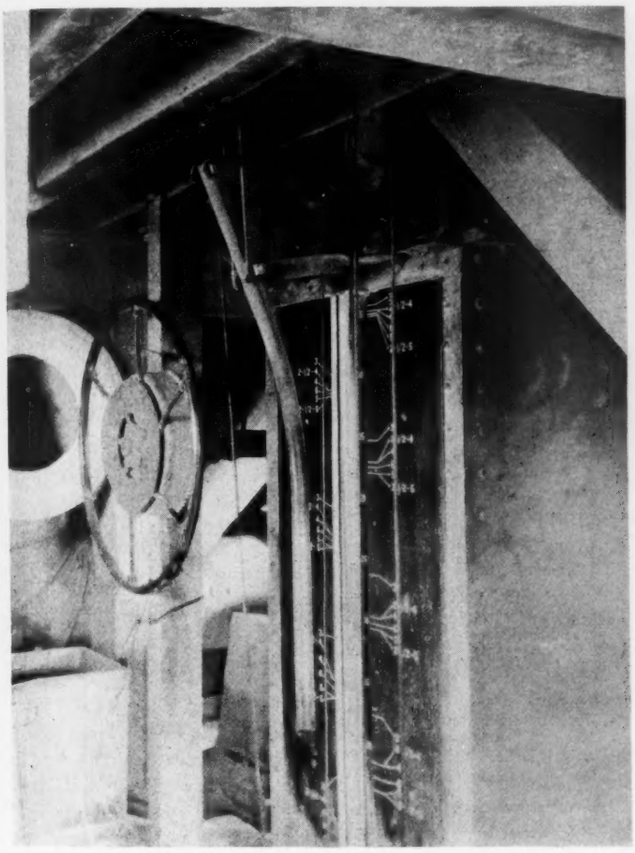
Sand Operation

The sand is at present obtained from the river at a point opposite the stone plant by suction dredging with a 10-in. steam-engine-driven pump, which discharges over a gravity screen to take out any coarse material.

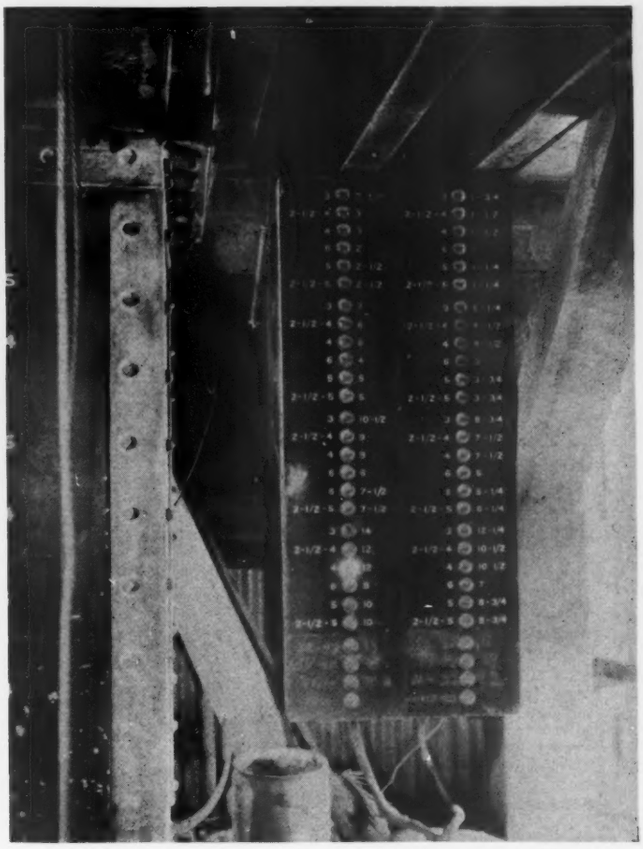
A Dorr bowl classifier mounted on one side of the dredge so that it discharges directly into the barge is used to wash and dewater the sand.

The dredge and also the stern wheel, river type, steam tow boat are on steel hulls. Four barges, two of steel and two of wooden construction, are used, each barge having a net carrying capacity of about 250 tons of sand.

The general offices of the company are at the plant. R. Snow Wilson is president; Ben F. Dickinson is vice-president, and John C. Eakin is secretary-treasurer.



Batcher for stone, with markings and pointer for any mix and any size batch



Signal board at batchers. Lights indicate mix and size of batch, also number of sacks of cement

Tow boat, barge and dredge taking sand from river

Cement for the Hoover Dam a Big Order

THE CONSTRUCTION of the Hoover, or Boulder Dam, and its incidental structures, on the Colorado River, will require 4,500,000 cu. yd. of concrete. An idea of the size of this as a concrete job can be had when it is stated that during the 29 years' history of the U. S. Reclamation Service 4,400,000 cu. yd. of concrete have been used in all its projects. In other words this one job will require more concrete than all the previous jobs put together. Estimating a barrel to a cubic yard this is 4,500,000 bbl. of cement to be required.

The Six Companies, Inc., San Francisco, Calif., contractors for the dam, are soon to take bids on equipment for a 700-ton-per-hour sand and gravel plant to be erected near the damsite. One of the principals in the Six Companies, Inc., H. J. Kaiser, president of the Kaiser Paving Co., Oakland, Calif., has been a quarry and gravel-plant operator for many years.

THE READY MIXED CONCRETE CO.
Pittsburgh, Penn.
J. E. Burke

DETAILED PROFIT AND LOSS STATEMENT

Month of.....1931

	Total for month		Central Plant Mixed				Truck Mixers				Truck Rental Expense		Idle Time Expense						Truck Cost per Mile	
			Plant No. 1		Plant No. 2		Barrymore		Highway				Plant No. 1		Plant No. 2					
		Per Yard		Per Yard		Per Yard		Per Yard		Per Yard		Per Yard		Per Yard		Per Yard				
SALES—Concrete																				
Truck Rentals																				
Total Sales																				
Less Discount on Sales																				
Net Sales																				
COST OF GOODS SOLD																				
Cement																				
Sand																				
Gravel																				
Miscellaneous																				
Total Cost of Goods Sold																				
OPERATING EXPENSES																				
Labor—Superintendence																				
Plant																				
Rent																				
Light, Heat and Power																				
Insurance																				
Depreciation																				
Taxes																				
Water																				
Supplies and Repairs																				
Miscellaneous																				
Total Operating Expenses																				
DELIVERY EXPENSES																				
Labor—Overhead																				
Garage																				
Drivers																				
Rent																				
Light, Heat and Power																				
Insurance																				
Depreciation																				
License Fees																				
Gas and Oil																				
Tires and Tire Repairs																				
Tools and Repairs																				
Miscellaneous																				
Total Delivery Expenses																				
IDLE TIME EXPENSES																				
Labor																				
Rent																				
Power, Light and Heat																				
Insurance																				
Depreciation																				
Taxes																				
Water																				
Supplies and Repairs																				
License Fees																				
Total Idle Time Expense																				
ADMINISTRATION EXPENSES																				
SELLING EXPENSES																				
INTEREST EXPENSE																				
Total Deductions																				
Profit or Loss for Month																				
Add Miscellaneous Income																				
Profit or Loss for Month																				

Sheet for detailed statement of a ready-mixed concrete business. Aside from its interest as a labor-saving form, it is valuable as a tabulation of all the items of expense entering into ready-mix manufacture

New Ready-Mix Plant at Seattle

THE MODERN CENTRAL CONCRETE mixing plant being built at the southern end of Lake Union, Seattle, Wash., by the Pioneer Sand and Gravel Co., is to be completed by July 1. The layout includes timber-constructed bins of capacity for the storage of 3000 cu. yd. of graded sand and gravel, and a building that will hold five carloads of cement. The principal operating equipment consists of three 2-yd. concrete mixers and an unloading crane of the capacity of 200 cu. yd. per hr. The ready-mix delivery trucks are being equipped with 2-yd. bodies of the bath-tub type, furnished by the Wood Hydraulic Hoist and Body Co., Seattle. The maximum distance of haulage is figured at about 10 miles. The company's expenditures on the plant and accessories amount to about $150,000.

Sand and Gravel Business

The Pioneer Sand and Gravel Co., for 1930, marketed about 1,500,000 cu. yd. of mineral aggregates. The sales for 1931, it is estimated, may run one-third less, due to the lighter demands for concrete in the construction of buildings. The greater requirements this year are for highway paving and surfacing and for city street improvements.

Under an arrangement made some time ago, the Glacier Sand and Gravel Co. now sells its entire output to the Pioneer Sand and Gravel Co. The pits of both companies are on the great Steilacoom deposit, about 10 miles from Tacoma. Close to 90% of the material handled by the Pioneer company is taken from that deposit.

Cost Sheet Summary for Ready-Mix

THE "Detailed Profit and Loss Statement" reproduced above through the courtesy of J. E. Burke, president of the National Ready Mixed Concrete Association, is the one used by his own company in Pittsburgh, Penn. It is reproduced here for educational purposes, for those who are contemplating going into this business. Particular attention is called to the "idle time expense" item, which Mr. Burke says can at times become "a whale" of an operating expense.

This summary is particularly interesting also because it makes possible a direct comparison of the costs of both centrally-mixed concrete and truck-mixed concrete. The Ready Mixed Concrete Co., Pittsburgh, is owned jointly by several of the principal sand and gravel producing companies of the district.

Sand-Lime Brick Production and Shipments in April

THE following data are compiled from reports received direct from 20 producers of sand-lime brick, located in various parts of the United States and Canada. The number of plants reporting is four less than those furnishing statistics for the March estimate, published in the April 25 issue. The statistics below may be regarded as representative of the entire industry in the United States and Canada.

While the number of plants reporting for the month of April is four less than for March, it is estimated that production in April remains about the same as in March, as is the case with unfilled orders. Shipments by rail and truck, however, show an increase, while stocks on hand a decrease.

Average Prices for April

Shipping point	Plant price	Delivered
Dearborn, Mich.	$13.00	$14.50
Detroit, Mich.	13.00	15.50
Detroit, Mich.	.....	15.00
Grand Rapids, Mich.	.....	14.00
Iona, N. J.	11.00	14.50
Jackson, Mich.	13.00	.....
Menominee, Mich.	10.00	13.50
Milwaukee, Wis.	9.00	11.00-12.50
Minneapolis, Minn.	8.50	10.50
Mishawaka, Ind.	11.00	.....
Pontiac, Mich.	11.00	13.00
Saginaw, Mich.	12.00	.....
Syracuse, N. Y.	18.00	20.00
Tampa, Fla.	8.50	.....
Toronto, Can.	10.90	13.00

The following statistics show a comparison of the figures for March and April:

Statistics for March and April

	†March	*April
Production	4,868,840	3,999,410
Shipments (rail)	1,466,348	1,697,882
Shipments (truck)	3,742,653	3,330,089
Stocks	12,566,492	11,118,716
Unfilled orders	7,070,000	5,232,000

†Twenty-four plants reporting. Incomplete, one not reporting production and eight not reporting unfilled orders.

*Twenty plants reporting. Incomplete, seven not reporting unfilled orders.

Notes from Producers

Belt Line Brick Co., Minneapolis, Minn., reports that it has supplied brick for a new Northwestern Bell Telephone building.

Walker and Frank Brick Co., Detroit, Mich., has received orders for sand-lime brick for two new school additions.

Operations have been resumed at the plant of the Plant City Brick Co., Tampa, Fla.

Basalt Rock Co. Buys Healdsburg, Calif., Gravel Plant

SALE OF the Russian River Gravel Co. plant near Healdsburg, Calif., where the first graded gravel ever put on the market in California was produced, was completed May 1 at a price said to be $100,000. The Basalt Rock Co. of Napa was the buyer.

The Russian River Gravel Co. was established in 1906.—*Santa Rosa* (Calif.) *Republican.*

A System for Lime Hydrate Separation

By William J. Kuntz

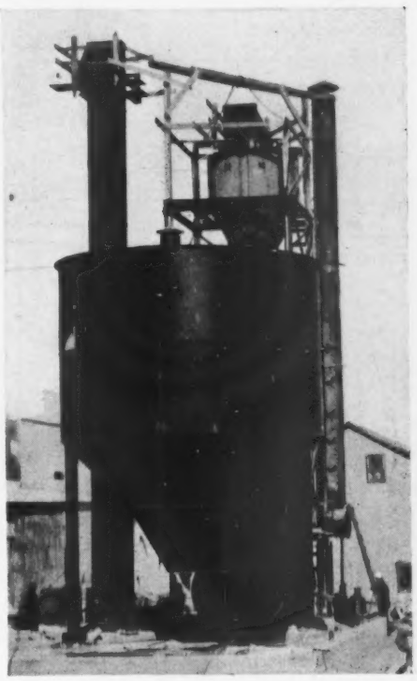
Manager, Lime Plants Department, Blaw-Knox Co., Pittsburgh, Penn.

FROM TIME TO TIME attempts have been made to cut the cost, lower the power application, and simplify control and operation of lime hydrate separation.

About four years ago the system herewith described was installed, since then some thirty installations have been made.

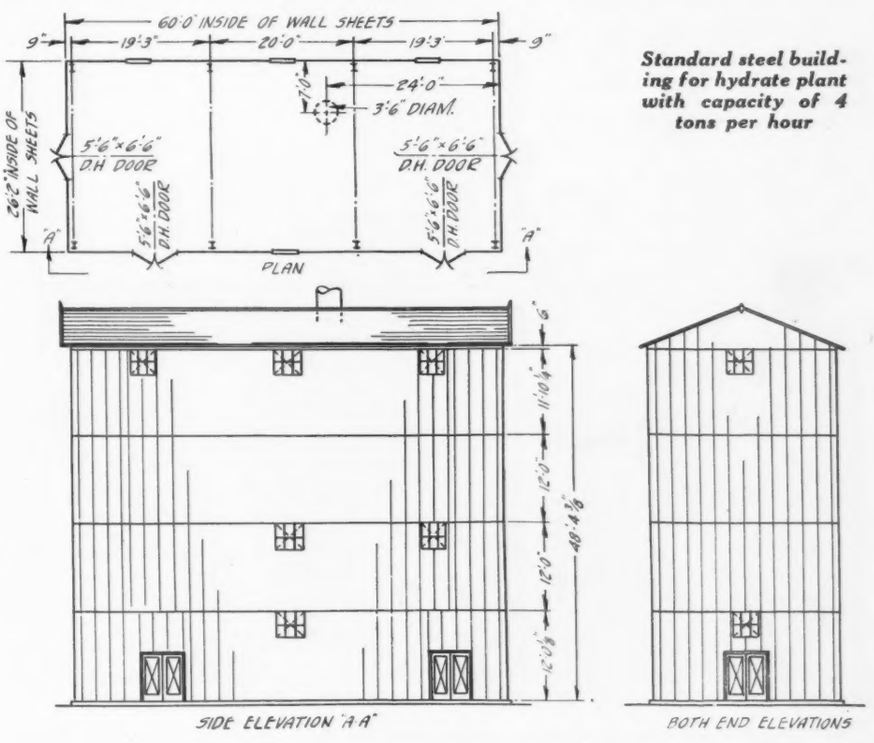
It is now generally conceded that lime, when properly hydrated and discharged for separation, contains 75% to 83% of fines ready for delivery to the finished hydrate bin. Many hydrators fall below this average, resulting in added difficulties to the separation problem. This condition is most generally found in continuous type hydrators where the control is not as sure as in a batch type machine. The system described provides a safety valve for such failure to properly hydrate, whatever the type hydrator. Furthermore, because of the fact that considerably more power is required in fine grinding, it is essential to remove without grinding contact, all of the fines suitable for delivery to the finished hydrate bin.

On account of the fact that more uses are being found each year for hydrate lime, and particularly because most of these new uses call for a finely separated hydrate of high quality, this system provides for single or double separation at one operation, provision being made as the flow sheet shows.

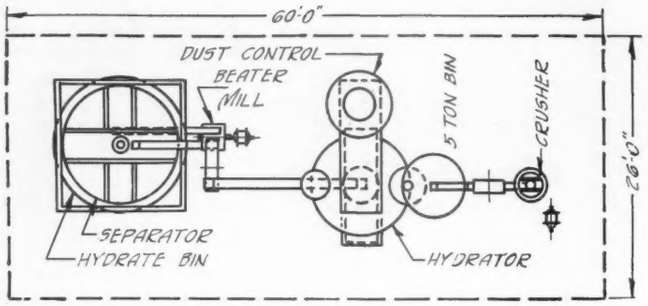


Single separator discharging into single bin

Systems of this kind are in operation where the following results have been ob-

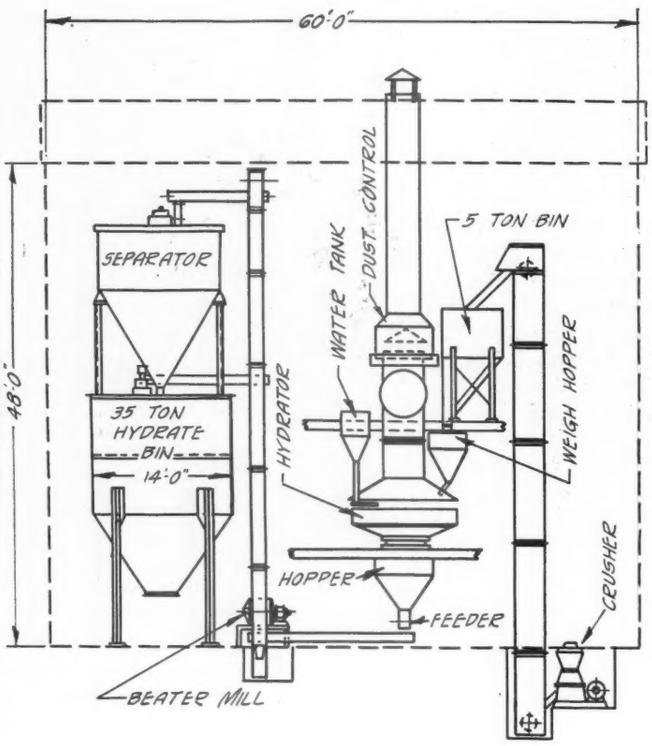


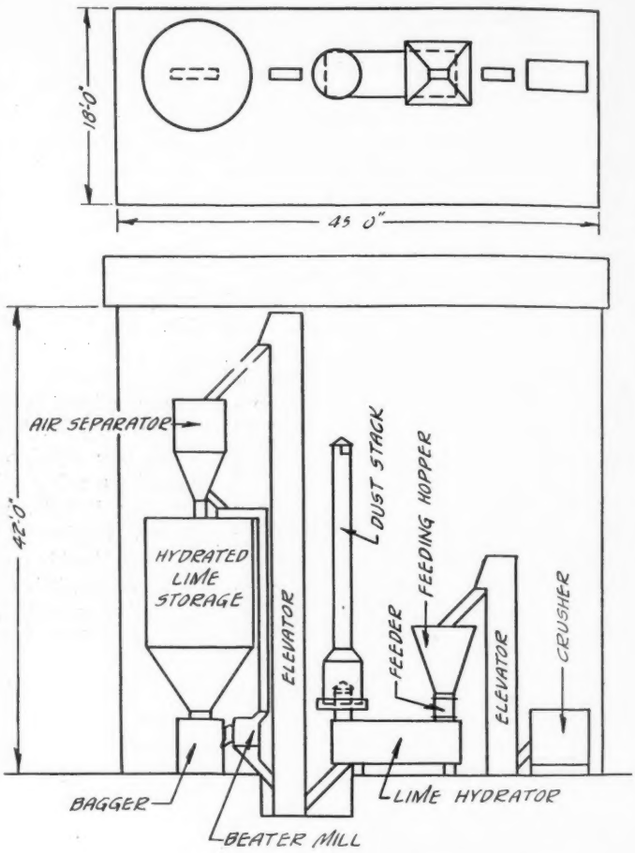
Standard steel building for hydrate plant with capacity of 4 tons per hour



Flow sheet—single separation—batch type hydrator

Hydrate discharged through automatic feeder, by gravity or screw conveyor, to elevator boot. Elevator lifts product to sufficient height to discharge, by gravity or screw conveyor, to a Whirlwind separator. Whirlwind separator discharges finished product directly into the finished hydrate bin. The rejects discharge, by gravity or screw conveyor, to beater mill with automatic throw-out. Automatic throw-out is adjusted to discharge only in accordance with the quality of the hydrate lime which is being processed. Discharge from beater mill is returned to the same elevator boot which lifts the product from the hydrator.

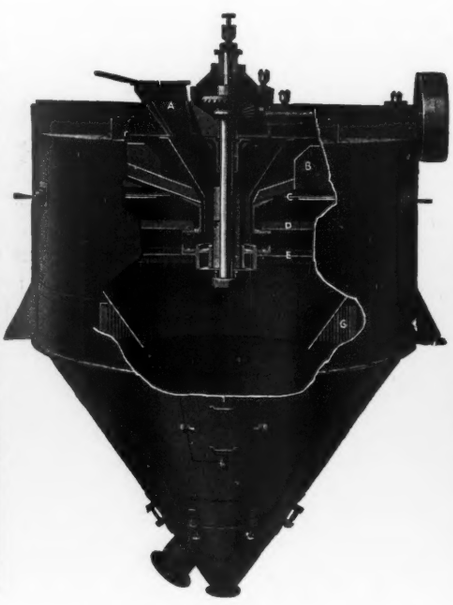




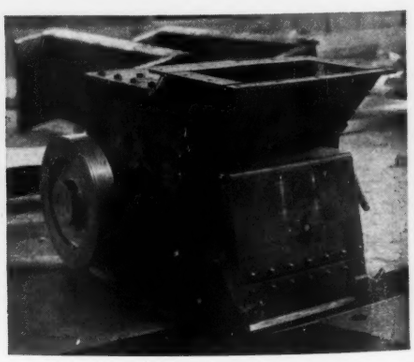
Flow sheet—single separation—continuous hydrator

The routing is exactly the same as described in the process of separation of hydrate in a batch type system, except that because of the lack of absolute control of the product as coming from the continuous hydrator as against the discharge from a batch hydrator, it is necessary to return the discharge from the beater mill to the hydrator itself, instead of to the elevator boot. The reason for this is evident at once; namely, the batch hydrator furnishes completely hydrated product; the continuous hydrator, in most instances, discharges a varied percentage of raw lime. As a surety, this product in the continuous type is, therefore, returned to the hydrator and then takes the same routing, of course, as all of the hydrate.

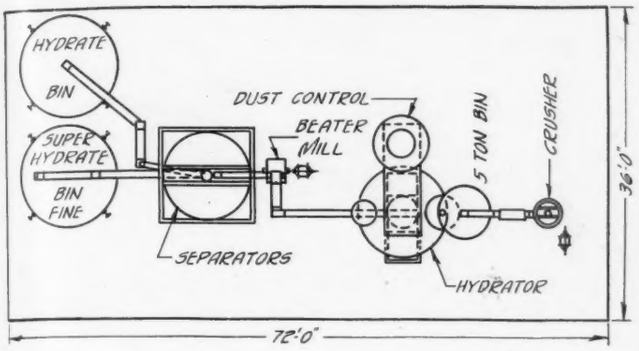
Double separator system

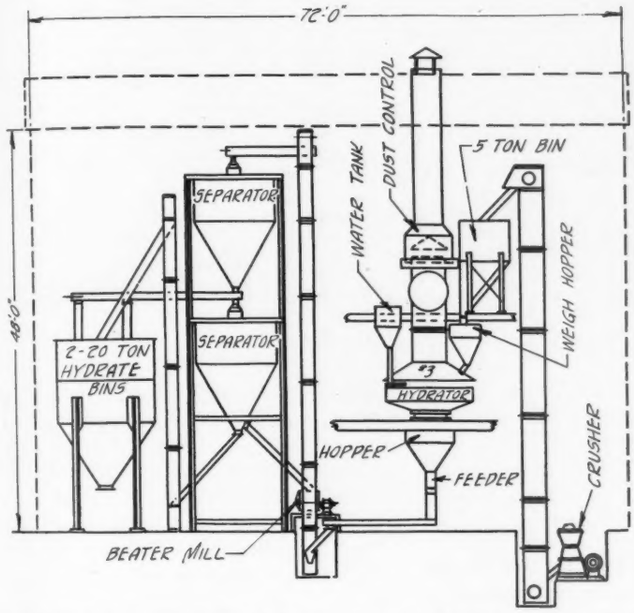


Interior of separator



The 20-in. beater mill with automatic throw-out





Flow sheet—double separation—for either continuous or batch hydrators

The routing is the same, in each instance, as described, except that in each case a second Whirlwind separator and a second bin for superfine hydrate are introduced into the system. From the products of the hydrator discharge, such percentage of "cream" or "flour-of-lime" is removed by the first Whirlwind separator as will not detract from the total CaO content of the secondary product. The remainder of the product is discharged in its entirety from this first Whirlwind separator directly into the second separator, and the process continues from this point the same as for single separation in either or both types of hydrators.

tained by the means of multiple separation:

NO. 1 SEPARATOR—CHEMICAL HYDRATE

Chemical Test

CaO	73.68
Loss on ignition	23.68

Screen Test

On 100-mesh	.10%
Retained on 200-mesh	.20%
Retained on 270-mesh	.30%
Retained on 325-mesh	.40%
Through 325-mesh	99.00%

NO. 2 SEPARATOR—MASONS' OR AGRICULTURAL HYDRATE

Chemical Test

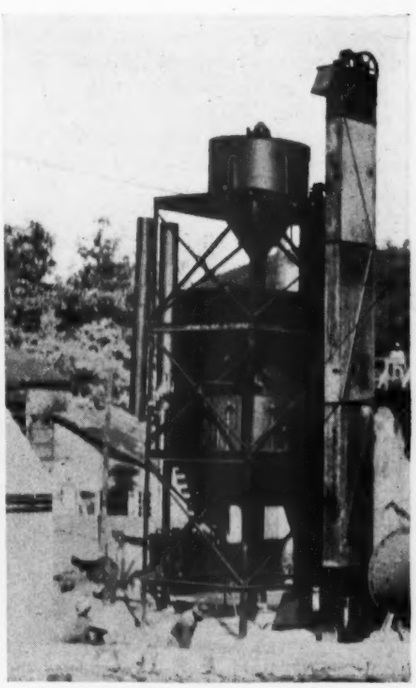
CaO	73.05
Loss on ignition	23.60

Screen Test

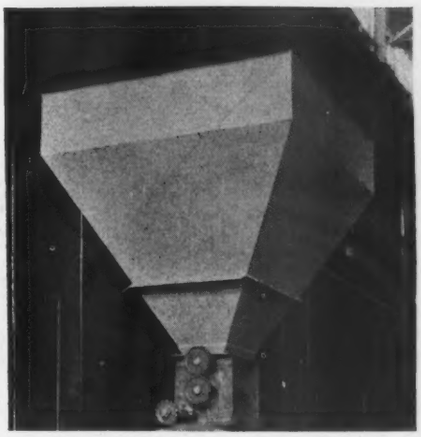
Retained on 100-mesh	.60%
Retained on 200-mesh	1.40%
Retained on 270-mesh	.70%
Retained on 325-mesh	1.35%
Through 325-mesh	95.95%

Provision is made in this system whereby the product is entirely controlled by adjustment of the beater mill with automatic throw-out. Any desired throw-out can be established. Many of these systems are operating with a throw-out of less than 1%, because most masons' or agricultural, or other secondary hydrates, are not deleteriously affected by the small percentage of impurities and core.

The advantages, briefly summarized, in the operation of these systems are: (1) absolute control of the product and multiple separation at one operation, (2) low power requirement, (3) a minimum of floor space is required, (4) dust is eliminated, (5) and the first cost of installation is low.



Construction of double hydrator



Discharge hopper with automatic feeder

Applicable to Present Plants

Existent hydrate lime plants, at a nominal expense, can be arranged for the adaptation of this system of hydrate lime separation for either single or double system. To insure absolute control of the product, or products, and to secure the low power application, the gravity and mechanical conveying system must be used instead of the air conveying system.

International Cement Corp. Advances Men

ANNOUNCEMENT is made of the election of H. A. Sawyer as vice-president and manager, Lone Star Cement Co., Louisiana, a subsidiary of the International Cement Corp., New York, N. Y.

Mr. Sawyer graduated in civil engineering from Texas A. and M. in 1916. After a year of varied construction work he entered the army as second lieutenant and left service as captain, Engineer Reserve Corps, in March, 1919. He then served two years as agent of the State Department as district commissioner and acting commissioner general for the republic of Liberia, two years as associate in consulting engineering work, and two years with the Portland Cement Association.

Mr. Sawyer has been associated with the International Cement Corp. and subsidiary companies for the past four and one-half years. For the past three years he was in charge of the sale and promotion of "Incor" cement in Lone Star subsidiary territories.

Going to Brazil

He succeeds Scott Thompson in his present position. Mr. Thompson has been appointed vice-president and manager of the Cia. Nacional De Cimento Portland, Rio de Janeiro, Brazil, which is building a new International mill in that country.

Electric locomotive hauling train of seven cars at plant of Inland Lime and Stone Co., Manistique, Mich.

Electric Quarry Locomotive

By P. V. Tierney
Westinghouse Electric and Manufacturing Co.

A 58-TON ELECTRIC LOCOMOTIVE made by the Differential Steel Car Co. was placed in service by the Inland Lime and Stone Co., Manistique, Mich., last fall. Recently several more have been delivered. This locomotive is different from the ordinary electric locomotive in that it carries a 56-ton live load "ballast," which is dumped at the end of the run, the locomotive returning light.

The locomotive in addition to its 56-ton load pulls a train of seven 33-ton cars, each with a 56-ton load. The train ascends a half mile of 1% grade as it leaves the quarry and travels seven miles on a track having a slight grade to a crushing plant, where the cars are dumped. The train returns light to the quarry and completes the round trip in 64 minutes. The actual time required for the loaded train to travel from the quarry to the crushing plant is 20 minutes, although the 7-mile trip has been made in 14 minutes.

Locomotion is obtained from four Westinghouse type 560-B-6 motors, each developing 260-hp. at 600 volts d.-c. These motors are of the series field type having commutating poles which produce sparkless commutation at normal loads.

Westinghouse Type BP spur gears having a ratio of 66/15 transmit the power from the motors to the four 36-in. driving wheels. The maximum available tractive effort at each pair of wheels is limited by the setting of the overload relay in each motor circuit, which is calibrated for currents corresponding to tractive efforts of from 8,500 lb. to 11,500 lb. per pair of wheels. The relay is normally set at 9,500 lb. tractive effort.

The motors are controlled by Westinghouse HL pneumatic three-speed control. A master controller operates electro-pneumatic switches which are closed and held closed under air pressure from the air reservoir on the locomotive. The motors are reversed by a hand operated drum reverser which reverses the fields of each of the motors.

In accelerating the car the motors are first all connected in series, then series-parallel, and finally all four in parallel. This method of acceleration saves some energy which would ordinarily be lost as heat in the grid resistors. The motors are cut out in pairs and in such a case the master controller cannot be advanced beyond the series position, thereby preventing the motors from being excessively loaded.

The electrical equipment has ample protection against overload and cases of power failure. Fuses and lightning arresters are provided for in both the trolley and trolley reel circuits. Overload relays in each motor circuit are provided and each is calibrated for four values of current corresponding to four maximum values of tractive effort. In case the line voltage should become zero and then suddenly return to normal, an excessive load would be drawn by the motors due to the slowing down of the frame or of the skipping of notches while accelerating. When such a condition happens the no-voltage relay prevents power from being applied to the motors until the master controller is brought back to the "off" position, after which, operation can be resumed.

On arrvial at the plant

Power is collected from the trolley by two means: By use of a pneumatically operated overhead device which reaches 6 to 8 ft. to the right and left of the locomotive to the trolley; and by use of a power cable which hooks over the trolley and is wound on a motor driven reel located under the cab. The trolley reel permits the use of the locomotive away from the end of the trolley line.

For the operator's convenience there are mounted in the cab two air pressure meters, a wattmeter, an ammeter, a bell cord, an air whistle, and eight hand operated switches for controlling the following: Front headlight, rear headlight, tail light, cab lights, heaters, control switch, trolley reel cable control, and trolley reel motor. The control unit switches, being mounted in a cabinet in the cab, are easily accessible for inspection by the operator.

Compressed air is used not only in operating the unit switches and overhead current collecting device, but also in stopping the car and in dumping the load from the locomotive. The locomotive load is dumped to the right or left by admission of compressed air to one of two air cylinders located under the dump body.

In a load test on the property of the Inland Lime & Stone Co. this locomotive with a live load of 56-tons started nine 35-ton dump cars each having a load of 56 tons on a half mile of 1% grade. Full series position was reached in two minutes with no slack in the train at starting.

Ohio Producers Advertise Benefits to Public Gained from Road Contract

FOLLOWING THE AWARD of the Zanesville-Caldwell section of Ohio State Route No. 146, the Ava Brick Co., Ava, Ohio; Columbia Cement Co., Fultonham, Ohio; Muskingum River Gravel Co., Zanesville, Ohio, and Zanesville Clay Products Co., Zanesville, published a full-page advertisement in the *Columbus* (Ohio) *Dispatch*.

The advertisement was written as an appreciation to the governor for the award. Benefits to the public are told in detail. In all, it is said 555 men were put to work as a result of this road contract award.

Glass from Blast-Furnace Slag by New Process

AN Associated Press report from Auburn, Ala., recently said: "A new process of manufacturing glass from slag refuse of blast furnaces and common building sand was announced by Dr. C. A. Basore, professor of chemistry and industrial research at Alabama Polytechnic Institute. Through his discovery Dr. Basore said he believed thousands of tons of molten slag now going to waste may, by the addition of sand, be manufactured into glass commercially."

Bauxite Industry in 1930

SHIPMENTS OF BAUXITE from mines in the United States in 1930 were 330,612 long tons, valued at $1,928,297, a decrease of 10% in quantity and of 15% in total value, as compared with 1929, according to a statement of the United States Bureau of Mines, Department of Commerce.

In Alabama, bauxite was produced in 1930 from the Eufaula and "Lennig" mines, in Barbour County, and the Davis Hill No. 3 mine, in Henry County. The shipments were 33% less than in 1929, of which 79% was shipped for use in the chemical industry and the remainder for use in the abrasive industry.

Bauxite was produced in Georgia in 1930 at the Hatton and "Easterlin" mines, in Sumter County. Shipments from Georgia in 1930 were 136% more than in 1929, practically all of which was shipped for use in the chemical industry.

In 1930, bauxite was produced in Arkansas at four mines—the Sweet Home and Dixie No. 2, in Pulaski County, and the Bauxite and Superior mines, in Saline County. Shipments of bauxite from Arkansas in 1930 were 315,273 long tons, a decrease of 10% from 1929. The main production originated in the Saline County field, in which there was a decrease of 5%. The mines in Pulaski County shipped 30% less bauxite in 1930 than in 1929. The shipments from Arkansas were mainly for use in the aluminum industry, followed in order by the abrasives, chemical, and refractories industries.

The producers of domestic bauxite reported sales during 1930 at prices ranging from $5 to $14.12 a long ton. The average for Arkansas bauxite was $5.78 a ton, for Alabama $7.67, and for the United States $5.83. Probably the values reported to the Bureau of Mines by most operators represent nearly production costs, as the greater part of the domestic bauxite is produced by consumers of bauxite.

DOMESTIC BAUXITE SHIPPED BY PRODUCERS TO INDUSTRIES IN THE UNITED STATES, 1926–1930, IN LONG TONS

Year	Aluminum	Chemical	Abrasive	Cement and refractory	Total
1926	241,850	77,960	72,710	230	392,250
1927	186,490	62,410	71,790	250	320,940
1928	218,398	83,992	72,931	105	375,426
1929	172,807	86,419	99,925	6,626	365,777
1930	179,869	67,690	82,116	937	330,612

BAUXITE (INCLUDING BAUXITE CONCENTRATES) EXPORTED FROM THE UNITED STATES, 1926–1930

Year	Long tons	Value
1926	87,770	$4,741,260
1927	121,858	7,800,491
1928	112,984	5,210,912
1929	133,551	3,926,283
1930	104,504	3,776,774

BAUXITE SHIPPED FROM MINES IN THE UNITED STATES, 1926–1930

Year	Georgia, Alabama* and Tennessee		Arkansas		Total	
	Long tons	Value†	Long tons	Value†	Long tons	Value†
1926	20,680	$116,650	371,570	$2,298,550	392,250	$2,415,200
1927	17,110	95,920	303,830	1,892,860	320,940	1,988,780
1928	14,190	80,668	361,236	2,193,230	375,426	2,273,898
1929	14,723	84,480	351,054	2,181,158	365,777	2,265,638
1930	15,339	104,908	315,273	1,823,389	330,612	1,928,297

*No production from Alabama in 1926 and no production from Tennessee in 1927, 1929 and 1930.
†Value f.o.b. mines.

SUPPLY OF BAUXITE IN THE UNITED STATES, 1926–1930

Year	Domestic shipments		Imports		Total new supply	
	Long tons	Value	Long tons	Value	Long tons	Value
1926	392,250	$2,415,200	281,644	$1,187,497	673,894	$3,602,697
1927	320,940	1,988,780	356,580	1,572,236	677,520	3,561,016
1928	375,426	2,273,898	350,111	1,534,498	725,537	3,808,396
1929	365,777	2,265,638	380,812	1,753,840	746,589	4,019,478
1930	330,612	1,928,297	409,678	1,995,941	740,290	3,924,238

New Oklahoma River Sand Plant

SAND SECURED from the Salt Fork river bed north of Cherokee, Okla., has been used only locally in the past. Plans now call for sand production at the river for commercial purposes and will be shipped over the state for building and paving work.

Work was commenced April 19 on erecting a Sauerman slack-line cable excavator plant for securing sand from the river basin. The Concho Construction Co. of Oklahoma City is to operate the plant. The company operates several other plants similar to the one now being installed here.

It is said the first sand to be taken from the river will be used in surfacing U. S. Highway 64 between Cherokee and Alva.

Sand to be used in other places over the state will be trucked from the sand plant to Cherokee and will be shipped by rail from here.—*Cherokee* (Okla.) *Messenger*.

Louisiana Gravel Plant at Capacity

ACCORDING TO John C. Whitener, superintendent of the Colfax, La., plant of the Lutesville Sand and Gravel Co., things are really "humming" at the pit near Colfax.

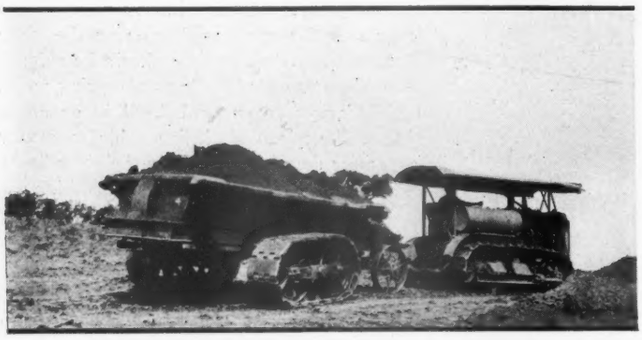
The company has sufficient material contracts to insure a steady run of one year.

The capacity of the washing plant may be increased at an early date, since motors of sufficient reserve power have been installed with this idea in view. The supply of crude material is practically inexhaustible, as the Colfax pit is considered one of the largest in the state. The Lutesville operators have just installed $16,000 additional loading machinery as insurance against the delays that may occur with the original machinery. The total investment approximates over $100,000. —*Colfax* (La.) *Chronicle*.

New Machinery and Equipment

New 15-Ton Crawler Wheels

THE NEW 15-TON Trackson crawler wheels made by the Trackson Co., Milwaukee, Wis., are now in production and, according to the manufacturers, they embody a number of exclusive features. These wheels



Full-floating pin construction, solid bushings and improved Timken bearings are incorporated in new crawler wheels

are designed for mounting on various types of wagons used for quarry and gravel pit operations, heavy hauling in general construction work, and other industrial fields.

Heavier tension members of the single strand type are used in the new model, replacing the double strand type which was formerly used. It is said these tension members are easily renewed, independently of the track shoes, when worn, which is also true of the hinge-pin bushings.

Changes in the new Trackson crawler wheels include full-floating pin construction, solid bushings are employed instead of the former split type, and improved Timken bearings with cork dust seals. Frames have been made heavier to withstand strains and side stresses.

Shoes for the 15-ton wheels are furnished in two widths, the 17-in. width for use on 5- and 7-ton cart type wagons, and the 10-in. for use on heavier wagons.

Compression Fittings and Tubing

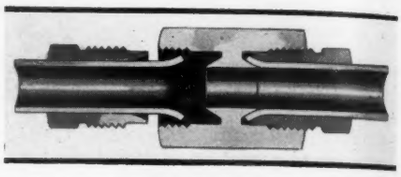
RECENTLY the Bailey Meter Co., Cleveland, Ohio, announced that Dieform compression fittings and tubing are available for small service lines in the power plant and industrial field.

The accompanying illustration shows an exploded view of a Dieform tubing union which shows the method in which the joint is made. The left-hand side of the tubing union is shown with the tube in place and the tube nut screwed down tightly to complete the metal-to-metal joint, while the right-hand side shows the tube nut unscrewed and slipped back along the tubing, which in turn is removed a slight distance from the seat in the fitting. This illustration shows how the tubing is gripped between the seat in the center fitting and the seat on the tube nut.

In flaring the tubing the Dieform nut serves as a die. It is said the moderate angle of flare prevents the tube from splitting or cracking and also permits the use of hard drawn tube when desirable.

Brass, monel metal or steel Dieform compression fittings and copper or steel tubing are especially well suited for piping where many bends must be made in the line and where an absolutely tight installation is required for high pressure and high temperature service. With these materials, tight metal-to-metal joints may be made, it is claimed, by an inexperienced laborer without thread compound, dies or tools other than a hammer and flaring tool. The manufacturer says joints made in this manner will resist vibrational strains as well as strains resulting from expansion and contraction of the tube caused by intermittent temperatures.

According to the manufacturer, double extra heavy brass fittings with extra heavy soft annealed or half-hard copper tubing are suitable for pressures which do not exceed 800 lb. per sq. in. and where the intermittent temperatures are under 600 deg. F. Where higher intermittent temperatures are expected, steel or monel compression fittings are recommended. Steel tubing should be used for pressures in excess of 800 lb. per sq. in. if the installation is subject to steam temperatures at intervals, although for hydraulic lines extra heavy copper tubing is satisfactory for pressures up to 2000 lb. per sq. in.

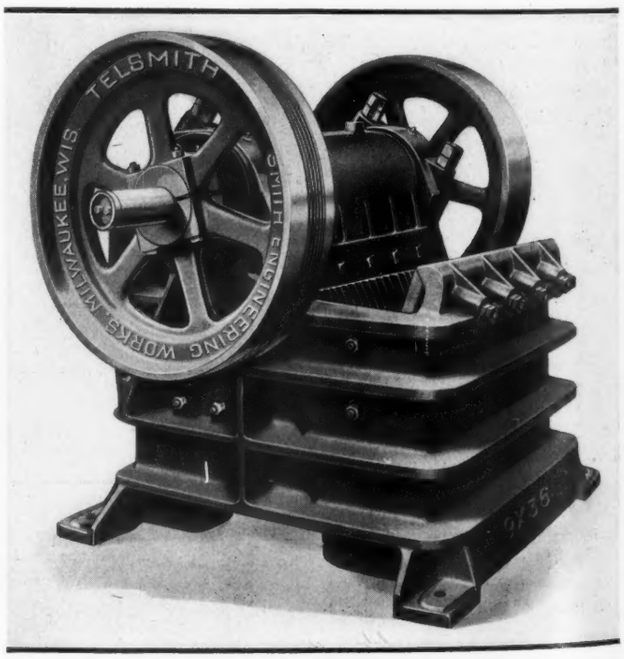


Tubing is gripped between seat of center fitting and tube nut

Dieform fittings and tubing may be used for connections to metering equipment and for water, oil, steam, compressed air and gas lines.

New Jaw Crusher

ANNOUNCEMENT is made by the Smith Engineering Works, Milwaukee, Wis., of the Telsmith-Wheeling jaw crusher. This crusher has been developed from the Wheeling jaw crusher, which Smith Engineering Works acquired in 1930. The maker says important changes have been made in the bearings, adjustment, jaw clamping device and main structure. It is said a peculiar crushing stroke of this crusher makes it effective in producing smaller sizes of rock.

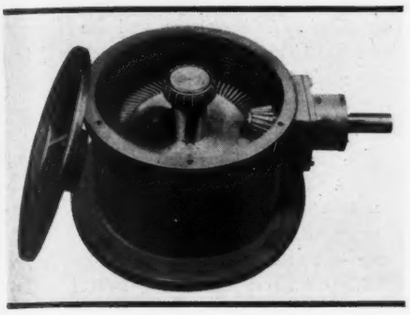


Bearings, adjustment, jaw, clamping device and main structure have been changed in new jaw crusher

Vertical Spiral Bevel Gear Speed Reducer

A NEW TYPE of speed reducer, the vertical spiral bevel type, is announced by the D. O. James Manufacturing Co., Chicago, Ill.

Gears are made of chrome nickel of spiral bevel type to secure greater efficiency for the improved tooth form which, it is said,



Chrome nickel spiral bevel gears used

provides more teeth in constant contact and a greater tooth bearing or pressure area in each tooth of given size.

Shafts are made of "40" carbon steel, and roller bearings are provided on both drive and driven shafts.

Where large ratios of reduction are required this type of reducer is made integral with a planetary reduction unit so that all ratios from 8 to 1 to 1600 to 1 are available. They are made in sizes from ½- to 100-hp.

According to the manufacturer, the housing of this unit prevents oil leakage and keeps dust and dirt from filtering into it. It is said this unit is adaptable whenever vertical (up or down) drive is required.

New Heavy-Duty Engine

TO MEET the growing demand for a slow speed engine of the heavy-duty type, Linn Manufacturing Corp., Morris, N. Y., announces a new model HS four-cylinder Waukesha engine to be furnished with all 4-28-D Linn tractors.

Characteristics of the HS model used in 4-28-D machines and of its "brother," the 6-AB 6-cylinder engine used in 6-28-D machines, are roughly compared as follows:

	Governed speed	Hp. developed	Weight	Tractor speed per hr.
HS	1050 r.p.m.	73	1575	5
6AB	1500 r.p.m.	90	1500	7.15

All units in these two models, except the motor, front propeller shaft and transmission, are interchangeable.

Traveling Gantry Crane With Luffing Boom

A TRAVELING gantry crane of interesting design was recently completed by the Cleveland Crane and Engineering Co., Wickliffe, Ohio, for the U. S. Phosphoric Products Corp., East Tampa, Fa.

This crane spans 80 ft. of trackage and storage space. Its luffing boom, when horizontal for unloading of vessels, has an effective reach over the water of 44 ft. A view of this crane with luffing boom extended is shown in Fig. 1. Materials are removed from steamers by a bucket of 3-cu. yd. capacity of Blaw-Knox "Dreadnaught" type. The loaded bucket is lifted at a speed of 150 ft. per min., the holding line and closing line hoists being driven independently by two 80 hp. motors. A maximum lift of the bucket of 34 ft. above the dock floor affords a large storage capacity under the crane.

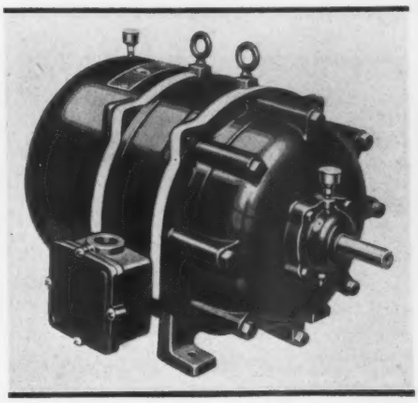
The luffing boom of this crane is raised into almost a vertical position to clear the ships while docking. It is said the boom can be raised at the rate of 5 ft. per min. Each tension member between the top of the A-frame and the end of the boom has a flexible joint which allows these members to fold when the boom is being lifted. A 30-hp. motor drives two hoisting drums, installed near the top of the A-frame, which raise the boom by wire cables attached to each boom girder. When raised, the boom is latched in position by engaging fingers. The latch is released by a foot pedal on the upper platform of the A-frame.

This crane is controlled from an operator's cab which is attached to the crane trolley. Thus the operator travels horizontally with the bucket, permitting accurate handling of the bucket at the speeds available. Five motors are required to operate the various motions of the crane.

This gantry crane has a rated capacity of 7½ tons. Its overall height is 77 ft. and its overall length with boom in horizontal position is 150 ft. In erecting this crane all riveted field connections were afterward also arc-welded to insure permanent alignment and impart additional strength and rigidity to the structure. The trolley frame and operator's cage are of arc-welded, rolled steel construction.

New Totally Enclosed Motor

THE HOWELL Electric Motors Co., Howell, Mich., announces the development of a new motor, which, it is said, bears the approval of the Underwriters' Labora-



Motor for hazardous locations

tory for Class 1, Group D. This classification covers use in gasoline vapor and air mixture and similar hazardous locations. The motor illustrated shows the totally enclosed fan-cooled frame.

Polyphase motors are of squirrel cage construction. All machined parts have large fitting surfaces to correspond with the Underwriters' Laboratory requirements for this class of service.

The single-phase motors are of squirrel cage construction similar to the polyphase motors.

Gantry crane has rated capacity of seven and one-half tons

Neil E. Salsich Elected Vice-President and General Sales Manager

AT A RECENT meeting of the board of directors, Neil E. Salsich was elected vice-president and general sales manager of the Jeffrey Manufacturing Co., Columbus, Ohio.

Mr. Salsich is a native of Wisconsin, having been born at Hartland. He attended Beloit College, Beloit, Wis., and then joined the Pennsylvania Steel Co. in 1903. He remained with that company and the Bethlehem Steel Co., by which it was absorbed, for 28 years. As manager of railroad and mining sales, Mr. Salsich became closely associated with the coal and mining industry.

Neil E. Salsich

The Jeffrey Manufacturing Co., in addition to its main plant at Columbus, Ohio, operates the following subsidiary companies: The Ohio Malleable Iron Co., Columbus, Ohio; The Galion Iron Works and Manufacturing Co., Galion, Ohio; Jeffrey Manufacturing Co., Ltd., Montreal, Canada, and the British-Jeffrey Diamond Co., Wakefield, England.

Paving Blocks From Slag

A FRENCH PATENT covers the manufacture of paving blocks from blast-furnace slags, the composition of which is limited to SiO_2 and CaO by casting the slag at a temperature between 1100 and 1200 deg. The slag may be submitted to a process of distillation before casting, and the cooling is allowed to take at least five days.—*Chemical Abstracts.*

New Wisconsin Gravel Pit

E. G. BIGHAM, Winona, Minn., contractor, is one of the organizers and principal stockholders in a sand and gravel concern to be known as the Western Wisconsin Sand and Gravel Co., which is opening a large pit near the Burlington railroad right-of-way south of Alma, Wis.

Alfred Rasmussen, La Crosse, is the other promotor and principal stockholder. The home office is to be located in La Crosse.

Earl Zenker, La Crosse, is in charge of the crew stripping the top soil from the bed of gravel. A space 100 ft. by 200 ft. is being opened up and the deposit there is about 30 ft. deep.

The location of the gravel pit is on a tract of 175 acres of land north of Buffalo City purchased by the company from John Ganschow. The location was chosen after tests for gravel beds were made for many miles along the east side of the Mississippi.

It lies along the railroad track. According to Mr. Zenker, the railroad company will in the near future put in about 2000 ft. of side track at the plant. The machinery is to be electrically driven.

In case the government dam at Alma is constructed it is expected that gravel may be transported by means of barges loaded at the slough which flows on the west of the gravel company's tract of land.—*Winona* (Minn.) *Republican-Herald.*

New Operation in Nebraska

WORK IS being pushed to get the machinery set up for operation of the gravel pit on the John Brockman farm near Coleridge, Neb. According to estimates of railroad and state engineers there are 23,000,000 cu. yd. of gravel in this pit. Omaha contractors have contracted with Mr. Brockman to remove the gravel and $40,000 worth of machinery will be installed.

The Omaha railroad has built a spur to the pit and constructed a mile of side track at Laurel to care for the extra cars that will be used in shipping the gravel. The railroad itself has contracted for 32,000 cu. yd. of the gravel to be used for ballast.

The Interstate Power Co. will furnish electricity for operating the machinery.—*Sioux City* (Ia.) *Tribune.*

Miami Gravel Co. Expands

THE MIAMI Gravel Co. enters an expansion program in the recent purchase of the Frank Arnold farm of 50 acres located on the East Miami River road, near the C. & O. depot, at Miamitown, Ohio. This company is financed by West Virginia capital and is headed by Mr. Gatewood. Recently an order for 300,000 cu. yd. of gravel, to be used at the new Union Terminal building at Cincinnati, Ohio, was received. The property joins the Union Terminal pit.—*Harrison* (Ohio) *Press.*

Pittsburgh Sand and Gravel Sales and Distributing Agency Formed

THE SAND and Gravel Co. of Pittsburgh, Penn., a sales and distributing agency with offices in the First National Bank Bldg., was organized May 5 and began operations May 11. This company is represented by the following concerns, all of Pittsburgh: J. K. Davison and Bro., Iron City Sand and Gravel Co. and the Keystone Sand and Gravel Co. This agency will have charge of distributing material produced by these concerns in river barges, by trucks and for rail delivery.

The officers are W. A. Bliss, president; Charles Yon, vice-president, and H. S. Davison, treasurer. The personnel of the new agency will include representatives of the three producing firms. Approximately 4,000,000 tons of sand and gravel will be distributed annually.—*Pittsburgh* (Penn.) *Post-Gazette.*

Portland, Oregon, Selling Organization Dissolves

THE CENTRAL Sand and Gravel Co., Portland Ore., selling organization for eight of the larger sand and gravel firms, was dissolved and is discontinuing business as of May 2.

The several companies which composed the Central Sand and Gravel Co. will each continue business under their separate identity. They are: Columbia Contract Co., Hackett Digger Co., Hawthorne Dock Co., Nickum and Kelly Sand and Gravel Co., Pacific Bridge Co., Ross Island Sand and Gravel Co., Star Sand Co. and James A. C. Tait Co.

H. P. Warren, who has been manager of the Central Sand and Gravel Co., is returning to the Portland Gravel Co., a producing company.—*Portland* (Ore.) *Journal of Commerce.*

Gravel Pit to Be Developed

L. W. LATSHAW, of Chicago, Ill., has arrived in Brainerd, Minn., and has assumed his position as superintendent of the Betzold Washed Sand and Gravel Co. Offices will be established here.

Test runs of the new machinery being installed in the gravel pit have been made. The machinery includes a crusher, washer, large hopper to sort and store the gravel, and propositions are now being considered to establish a mixing plant to make concrete and mortar.

A crew is now at work in the gravel pit building the hopper frames, the various bins for storing four grades of gravel, and installing the other machinery, etc.

The gravel, Mr. Latshaw said, has been tested by the state, and is of a high quality.—*Brainerd* (Minn.) *Dispatch.*

Recent Material Prices Bid, and Contracts Let

Washington Court House, Ohio—The Hyer Construction Co., with a quarry seven miles south of this city, has been awarded a contract to furnish 2000 tons or more of stone, delivered on the streets of the city, at $1.50 per ton.—*Columbus* (Ohio) *Dispatch.*

* * * * *

Bellefontaine, Ohio—Bellefontaine Board of Control voted to split the contract for supplying the city street department with 1500 tons of cushed stone during 1931, bids for which were opened recently.

The Bellefontaine Development Co. was awarded the contract for the larger sized stone to be used, at its bid of 90 c. a ton at the pit or $1.20 a ton delivered.

The East Liberty Stone Co. was awarded the contract for the finer stone, to be used as top dresing, at its bid of 90 c. a ton at the pit.—*Bellefontaine* (Ohio) *Examiner.*

* * * * *

Janesville, Wis.—W. J. Lathers, of the town of Turtle submitted the lowest bid on gravel road work in Rock county at a letting in Janesville recently. He bid 38½ c. a cu. yd. on 2¼ miles on the Finneran road in the town of Magnolia, which will make that project cost $1,540.

Drew and Garey, Evansville, submitted a bid of 39½ c. a cu. yd. on the Stearns road in the town of Porter.

* * * * *

Low bids on other projects were as follows:

Lawrence road, town of Union, Drew and Garey, 70 c. on 1200 yd., $840.

Fellows Station and Whitmore roads, town of Center, 7200 yd., and Wheeler road, Center, 3400 yd., Paul Berg. The bid on the two was 47 c., $3,384, and on the Wheeler road, 41 c., $1,394.

Snyder-Ballmer road, town of Center, 3000 yd. at 58 c., $1,740. Berg and Kennedy Brothers submitted identical bids.

Bemis-Roherty road town of Center, 2200 yd. at 48 c., $1,056, with Berg and Kennedy tying.

Godfrey road town of Lima, Kennedy Brothers, Footville, 58 c. on 1800 yd., $1,044.

Vogel road, town of Milton, Paul Beg, Cambridge, 48 c. on 2200 yd., $1,056.

Clear Lake road, town of Milton, W. J. Lathers, 40 c. on 2500 yd., $1,000, 1½ miles.

Rose road, town of Milton, Berg, 41 c. on 2500 yd., $1,025, 2 miles.

Condon road, town of Fulton, Karlyst Co., Stoughton, 65 c. on 1500 yd., $975, 1 mile.

Stearns road, town of Porter, Drew and Garey, 39½ c. on 1800 yd., $711.

East Butts Corners road, town of Union, Drew and Garey, 41 c. on 300 yd., $1,230, 1¾ miles.—*Beloit* (Wis.) *News.*

New Orleans, La.—Francis Williams in his radio talk Sunday noon on Governor Long and the Long administration, directed his attack against the prices being paid for cement by the Louisiana road department. He charged that on the Mansfield-Benson highway the state was paying $2.74 to $2.77 per bbl. for cement, when the state of Oklahoma had contracted for cement to be delivered to some 60 points in that state for $1.41 per bbl.

Based on this calculation, Commissioner Williams said the Long administration had recently contracted for 8,500,000 bbl. of cement and that the "overcharges on this purchase of material may aggregate more than $10,000,000."—*New Orleans* (La.) *States.*

* * * * *

Phoenix, Ariz.—Recent bids for the State Highway Department on "subgrade stabilizer and mineral aggregates" are as follows:

Subgrade stabilizer .....46 to 80c. per cu. yd.
Mineral aggregate.....65 to 90c. per cu. yd.

In connection with these bids mineral aggregate as set up by the specifications requires that the percentage of gravel be not less than 40% and not more than 50%. The amount of crushing will depend somewhat on the location of the designated pit, but in most cases it will be at least 20%. The maximum size on mineral aggregate is 1 in.

The same comment applies to subgrade stabilizer, but the rock content is usually kept (although it is not specified) between 25% and 35% with crushing usually between 5% and 30%.

* * * * *

Maitland, Mo.—The Hornecker Stone Co., which has a quarry near New Point, is prepared to furnish crushed limestone for graveling and concrete at $1.80 a ton and agricultural lime at $1.50 per ton at the quarry. The quarry is furnishing graved for farm-to-market roads in this section.—*Maitland* (Mo.) *Herald.*

Hudson River Co. Buys Mt. Taurus

MOUNT TAURUS, a great pile of granite 1400 ft. high and located on the Hudson river north of Cold Springs, N. Y., has been purchased by the Hudson River Co. of North Hempstead, L. I., N. Y. The property, involving about 1000 acres, was acquired from the Mount Taurus Park Association and will be worked on a commercial scale.

The property extends along the Cold Spring Beacon river road in a northeast direction about 2½ miles. The purchase was made for the stone in the mountain, which, it is said, is the finest granite to be found in this section of the country.—*New York* (N. Y.) *Herald-Tribune.*

William L. Hartley Appointed Detroit District Sales Manager

LINK-BELT CO., Chicago, Ill., announces the appointment of William L. Hartley as district sales manager in charge of the Detroit territory.

Mr. Hartley has been in the employ of the Link-Belt Co. since 1915, having started in the engineering department, working in the contract, standard and estimating departments.

From 1917 to 1919 he was with the United States Expeditionary Forces in France, re-

William L. Hartley

joining the Link-Belt organization after his return from service.

In 1926 Mr. Hartley was promoted to the general sales department, and in 1927 was transferred to the Kansas City office. Since 1928 he has been in charge of the foundry sales division of the company.

The broad experience in engineering and sales work which Mr. Hartley takes to the Detroit territory will be available to those interested in materials handling and positive power transmission equipment in his district.

His new location will be 5938 Linsdale Ave., Detroit, Mich.

Ohio Crushed Stone Association Selects New Engineer

FRED E. SWINEFORD, director of public service of Akron, Ohio, has resigned to accept the office of chief engineer of the Ohio Crushed Stone Association, Columbus, Ohio. Mr. Swineford is a graduate civil engineer of Ohio State University (1917) and for two years was a division engineer in the Ohio state highway department. The rest of his professional career has been largely in public works construction.

Current Prices of Ready-Mix Concrete

AMARILLO, TEX.—Prices per cu. yd.*

Mix		Mix	
1–2 –0	12.00	1–2¾–5	8.50
1–2 –3½	9.50	1–3 –5	8.25
1–2 –4	9.25	1–3 –6	8.00
1–2½–5	8.75		

*For orders of 50 cu. yd. or more, prices are 75c less per cu. yd. than quoted. Free delivery within city limits for 2 cu. yd. or more per load; $1.00 per load extra for less than 2 cu. yd. loads, except to finish a job. Additional charge of 10c per mile per cu. yd. for deliveries outside of city limits.

BELLINGHAM, WASH.—Prices per cu. yd. f.o.b. bunkers.

Mix		Mix	
1–3–5	6.12	1–2–4	6.77
1–3–4	6.40	1–2–3	7.25

Additional charges for delivery to various zones. First zone, added charge of 75c per cu. yd. to bunker prices; second zone, added charge of $1.05; and third zone, added charge of $1.40. Special rates made for carload or 50-bbl. lots.

CHAMPAIGN, ILL.—Prices per ton†

Mix		Mix	
1–2–3	5.50	1–2–4	5.00
1–3–5	4.75		

†5% cash discount.

BOSTON AND CAMBRIDGE, MASS.—Base price per cu. yd.‡

Mix		Mix	
1–2– 4 (3 to 30 cu. yd.)	10.00	1–2– 3 (30 cu. yd. and over)	8.20
1–2 –4 (30 cu. yd. and over)	7.75	1–1½–3 (3 to 30 cu. yd.)	10.55
1–3 –6 (3 to 30 cu. yd.)	9.50	1–1½–3 (30 cu. yd. and over)	8.30
1–3 –6 (30 cu. yd. and over)	7.25	1–1–2 (3 to 30 cu. yd.)	11.30
1–2½–5 (3 to 30 cu. yd.)	9.75	1–1–2 (30 cu. yd. and over)	9.05
1–2½–5 (30 cu. yd. and over)	7.50	1–2 (3 to 30 cu. yd.)	13.00
1–2 –3 (3 to 30 cu. yd.)	10.45	1–2 (30 cu. yd. and over)	10.75

‡Discount of 50c per cu. yd. allowed on deliveries made between the 1st and 15th of the month if bill is paid on or before the 25th and on deliveries made between 15th and 30th if paid on or before the 10th of following month.

CLEVELAND, OHIO—Prices per cu. yd. to contractors for orders of 2 cu. yd. or more (a); Public Square basing point.

Mix		1st mile	2nd mile	3d mile (Maximum)
1–1 –2		8.20	8.45	8.70
1–2 –3		6.90	7.15	7.40
1–2 –4		6.50	6.75	7.00
1–2½–3½		6.50	6.75	7.00
1–2½–4		6.30	6.55	6.80
1–3 –4		6.20	6.45	6.70
1–2½–5		6.10	6.35	6.60
1–3 –5		5.90	6.15	6.40
1–3 –6		5.70	5.95	6.20
1–4 –8		5.40	5.65	5.90
1–2	Finish	8.00	8.25	8.50
1–2½	Finish	7.50	7.75	8.00
1–3	Finish	7.00	7.25	7.50

(a) Industrials or consumers 50c more than contractors. Extra charge for concrete delivered nights, Sundays or holidays, $1.00 per cu. yd. over daytime schedule. For "Velo" or "Incor" additional charge of $2.00 per cu. yd. For waterproof or plastic cements, additional charge of $1.25 per cu. yd. For orders less than 2 cu. yd. add $1.00 per yd. to above prices. Prices quoted are based upon normal discharge of load within 20 minutes after arrival of truck. A demurrage charge of $1.00 for each 15 minutes thereafter.

COLUMBUS, OHIO—Delivered prices per cu. yd.

Mix	Zones§ 1	2	3	4	5	6	7	8	9	10
1–1½–3	7.05	7.25	7.45	7.65	7.85	8.05	8.25	8.45	8.65	8.85
1–2 –3	6.85	7.05	7.25	7.45	7.65	7.85	8.05	8.25	8.45	8.65
1–2 –3½	6.65	6.85	7.05	7.25	7.45	7.65	7.85	8.05	8.25	8.45
1–2 –4	6.45	6.65	6.85	7.05	7.25	7.45	7.65	7.85	8.05	8.25
1–2½–4	6.35	6.55	6.75	6.95	7.15	7.35	7.55	7.75	7.95	8.15
1–3 –4	6.25	6.45	6.65	6.85	7.05	7.25	7.45	7.65	7.85	8.05
1–2½–5	6.15	6.35	6.55	6.75	6.95	7.15	7.35	7.55	7.75	7.95
1–3 –5	6.05	6.25	6.45	6.65	6.85	7.05	7.25	7.45	7.65	7.85
1–3 –6	5.95	6.15	6.35	6.55	6.75	6.95	7.15	7.35	7.55	7.75
1–4 –8	5.85	6.05	6.25	6.45	6.65	6.85	7.05	7.25	7.45	7.65
1–2	9.55	9.75	9.95	10.15	10.35	10.55	10.75	10.95	11.15	11.35
1–3	7.95	8.15	8.35	8.55	8.75	8.95	9.15	9.35	9.55	9.75

§All zones radiating from center of city. Zone 1 is one mile in radius, zone 2 is two miles in radius, zone 3 is three miles in radius, etc. Discount of 25c per cu. yd. allowed for payment 10th of month following delivery date. For orders over 50 cu. yd. a deduction of 25c per cu. yd. is allowed. Orders of less than 2 cu. yd. carry same haul charge as 2 cu. yd. load. Orders for 2 cu. yd. or over delivered in full loads at 2 yd. or more. No extra charge made for finishing load if less than 2 cu. yd.

FAIRMONT, W. VA.—Prices per cu. yd. (c)

Mix	Quantity	Delivered	Called for
1–2–4	Less than 1 cu. yd.	11.00	10.00
1–2–4	From 1 to 4 cu. yd.	10.00	9.00
1–2–4	From 5 to 10 cu. yd.	9.50	8.50
1–2–4	From 11 to 49 cu. yd.	9.00	8.00
1–2–4	From 50 cu. yd. and up	8.50	7.50

(c) For 1–2–3 mix add 50c per cu. yd. to prices quoted; for 1–3–5 mix deduct 50c per cu. yd. from prices quoted.

DES MOINES, IOWA—Prices per cu. yd. (b)

(Made with ¾-in. gravel for structural work)

Mix	Slump	Plant price	Zone A	B	C	D
1–2½–5	2 in.	6.50	7.00	7.25	7.50	7.75
1–2½–5	6 in.	6.75	7.25	7.50	7.75	8.00
1–2 –4	2 in.	7.00	7.50	7.75	8.00	8.25
1–2 –4	6 in.	7.25	7.75	8.00	8.25	8.50
1–2 –3½	2 in.	7.50	8.00	8.25	8.50	8.75
1–2 –3½	6 in.	7.75	8.25	8.50	8.75	9.00
1–2½–3	2 in.	8.00	8.50	8.75	9.00	9.25
1–2½–3	6 in.	8.25	8.75	9.00	9.25	9.50

(Made with pea gravel for cellar and sidewalks)

Mix	Slump	Plant price	Zone A	B	C	D
1–2½–5	2 in.	6.25	6.75	7.00	7.25	7.50
1–2½–5	6 in.	6.50	7.00	7.25	7.50	7.75
1–2 –4	2 in.	6.75	7.25	7.50	7.75	8.00
1–2 –4	6 in.	7.00	7.50	7.75	8.00	8.25
1–2 –3½	2 in.	7.25	7.75	8.00	8.25	8.50
1–2 –3½	6 in.	7.50	8.00	8.25	8.50	8.75
1–2½–3	2 in.	7.75	8.25	8.50	8.75	9.00
1–2½–3	6 in.	8.00	8.50	8.75	9.00	9.25

(b) Discount of 50c per cu. yd. allowed on deliveries made between the 1st and 15th of the month if bill is paid before the 25th and on deliveries made between 16th and 30th if paid before the 10th of following month. Quick setting $2.00 per cu. yd. extra; waterproofing, $2.00 per cu. yd. extra. Each zone approximately one mile.

HARTFORD, CONN—Prices per cu. yd. delivered

Mix		Mix	
1–2–4	(d) 7.15–7.25	1–2–0 finish	12.00
1–3–5	(d) 6.25–6.75		

(d) Placing, $1.00 per cu. yd. extra.

INDIANAPOLIS, IND.—Prices per cu. yd. in small quantities, for del'y. within 3 mile haul.

Mix	
1 bbl. cement/cu. yd. concrete	5.50
1¼ bbl. cement/cu. yd. concrete	6.00
1½ bbl. cement/cu. yd. concrete	6.50

LOS ANGELES, CALIF.¶—Prices per cu. yd.

Mix	1 to 5 yd.	5 to 25 yd.	25 or more
3–50–50	8.25	7.25	6.25
4–50–50	8.85	7.85	6.85
1–3 –6	8.95	7.95	6.95
1–3 –5	8.95	7.95	6.95
1–2½–5	9.50	8.50	7.50
1–3 –4	9.75	8.75	7.75
1–2¾–3½	10.00	9.00	8.00
1–2 –4	9.85	8.85	7.85
1–2½–3½	10.10	9.10	8.10
1–2½–3¾	10.05	9.05	8.05
1–2 –3	10.60	9.60	8.60
1–2 –3½	10.20	9.20	8.20

¶Above prices for deliveries in Zone 1 (1-5 miles). Added charge of 75c per cu. yd. for deliveries in Zone 2 (5 to 10 miles). Added charge of $1.50 for Zone 3 (10 to 15 miles). Discount of 50c per cu. yd. if payment is made within 10 days from delivery.

MEMPHIS, TENN.—Prices per cu. yd. delivered in city.†

Strength	With gravel aggregate	With stone aggregate	Strength	With gravel aggregate	With stone aggregate
4000 lb.	11.00	11.18	2000 lb.	8.00	8.40
3500 lb.	9.50	9.84	1800 lb.	7.30	8.25
2800 lb.	8.70	9.35	1600 lb.	7.10	8.05
2400 lb.	8.40	8.78			

†For del'y. outside city, price is 30c cu. yd. over above prices for each mile.

MILWAUKEE, WIS.—Prices per cu. yd. (e)

28-day breaking strength:	Per sq. in.	Slump 2 to 4 in.	4 to 6 in.	6 to 8 in.
Garage footings and walls	2000 lb.	7.00	7.40	7.80
Footings, floors, walls	3000 lb.	7.50	7.90	8.30
City paving	3300 lb.	7.75	8.00	8.40
Sidewalks, curbs	4000 lb.	8.25	8.75	9.25
24-hour high early strength	5000 lb.	10.00	10.50	11.00

Sold on old mixture method, 2- to 4-in. slump; 4- to 6-in. slump; 6- to 8-in. slump.

	Mix	
Walls—Garage footing	1–3–5	7.00
City paving	1–2–4	7.50
Garage floors, walls	1–3–3	7.50
Sidewalk	1–2–3	8.00
Special strength (machine bases)	1–1½–2½	9.50
Facing	1–3	10.50
Facing	1–2	12.00

(e) Discount of 25c per cu. yd. if paid by 10th of following month.

MONTGOMERY, ALA.—Prices per cu. yd. delivered in city limits. (g)

Mix		Mix	
1–2 –4	7.75	1–3–6	7.00
1–2½–5	7.25	1–2 mortar topping	13.00

(g) Discount of 25c per cu. yd. for payment in 30 days. Special quotations for quantity orders.

NEW ORLEANS, LA.—Plant prices per cu. yd. for 30 yd. or less. (h)

Mix	Cement Portland	"Incor"	Mix	Cement Portland	"Incor"
1–4 –8	6.10	7.25	1–2 –2	8.65	11.80
1–3 –6	6.70	8.25	2–3 –6	9.10	12.20
1–3 –5	6.90	8.65	2–3 –3	9.85	13.75
1–2½–5	7.20	9.15	1–1¼ topping	11.70	17.80
1–2½–4	7.35	9.50	1–2 topping	10.05	14.95
1–2 –4	7.70	10.05	1–3 topping	8.55	12.25
1–2 –3	8.15	10.85			

(h) Various charges, in excess of plant prices, are made for delivery based on zones; 5% discount for payment 15 days from date of invoice.

MORGANTOWN, W. VA.—Prices for jobs of 1 to 10 cu. yd., delivered.(f)

Mix		Mix	
1-2-3	9.50	1-2½-4	8.90
1-2-4	9.00	1-2½-5	8.50

(f) Prices subject to cash discount of 25c per cu. yd. for payment 15 days from date of invoice.

PITTSBURGH, PENN.—Range of prices, according to zone, for ready-mixed concrete. Prices per cu. yd. delivered, up to 200 cu. yd. (j)

Mix	Strength	
1-1½-2½	4000 lb.	9.05–10.05
1-2 -3	3500 lb.+	8.65– 9.65
Class A	3500 lb.	8.45– 9.55
1-2½-3½	3000 lb.+	8.35– 9.45
1-2 -4 Class B	3000 lb.	8.25– 9.35
1-2½-4½	2500 lb.+	8.05– 9.15
1-2½-5	2500 lb.	7.90– 9.00
1-3 -5	2000 lb.	7.80– 8.90
1-3-6	1500 lb.	7.65– 8.75

Prices per cu. yd. delivered, over 200 cu. yd. (j)

Mix	Strength	
1-1½-2½	4000 lb.	8.05– 9.80
1-2 -3	3500 lb.+	7.65– 9.40
Class A	3500 lb.	7.45– 9.20
1-2½-3½	3000 lb.+	7.35– 9.10
1-2-4 Class B	3000 lb.	7.25– 9.00
1-2½-4½	2500 lb.+	7.05– 8.80
1-2½-5	2500 lb.	6.90– 8.65
1-3 -5	2000 lb.	6.80– 8.55
1-3 -6	1500 lb.	6.65– 8.40

(j) Class A concrete is a special concrete prepared for the city of Pittsburgh. Plus indicates the strength shown is the minimum strength. Dealer's commission of 50c per cu. yd. allowed in all zones with exception of Yellow Zone. No commission allowed over 200 cu. yd. Prices subject to cash discount of 25c per cu. yd. for payment 15 days from date of invoice.

PUEBLO, COLO.—Prices per cu. yd.‖

Strength	Zone 1	Zone 2	Zone 3
3000 lb.	8.00	8.40	8.80
2700 lb.	7.75	8.15	8.55
2400 lb.	7.50	7.90	8.30
2100 lb.	7.10	7.50	7.90
1500 lb.	6.50	6.90	7.30
1200 lb.	6.50	6.90	7.30

‖On larger quantities to contractors, deduct 50c per cu. yd.

ROCHESTER, N. Y.—Prices per cu. yd.

Mix	Plant price	Prices for delivery to various zones: Zone 1	2	3	4	5	6	7
1-2 -3	7.00	7.75	7.90	8.05	8.20	8.35	8.50	8.65
1-2½-3½	6.55	7.30	7.45	7.60	7.75	7.90	8.05	8.20
1-3 -4½	6.20	6.95	7.10	7.25	7.40	7.55	7.70	7.85
1-4 -5	6.00	6.75	6.90	7.05	7.20	7.35	7.50	7.65
1-5 -6	5.65	6.40	6.55	6.70	6.85	7.00	7.15	7.30

SAN ANTONIO, TEX.—Prices per cu. yd. on city deliveries.

Mix		Mix	
1-3-5	7.50	1-2-4	8.00

SAN JOSE, CALIF.—Prices per cu. yd. delivered within one mile of plant. (k)

Mix	Up to 5 cu.yd.	Over 5 cu.yd.	Mix	Up to 5 cu.yd.	Over 5 cu.yd.
1-6	9.00	8.50	1- 9	8.00	7.50
1-7	8.50	8.00	1-12	7.00	6.50

(k) For deliveries outside of this area add 30c per cu. yd. per mile. Cash discount of 50c per cu. yd. if paid in full by 10th day of following month.

SANTA CRUZ, CALIF.—Price per cu. yd. delivered within two-mile radius of plant. (l)

Mix	Over 5 cu.yd.	Less than 5 cu.yd.	Mix	Over 5 cu.yd.	Less than 5 cu.yd.
1-6	9.00	9.50	1-8	8.10	8.60
1-7	8.50	9.00	1-9	7.90	8.40

(l) For deliveries outside of this area add 30c per cu. yd. per mile. Cash discount of 50c per cu. yd. if paid in full by 10th day of following month.

SPRINGFIELD, ILL.—Prices per cu. yd.

Mix		Mix	
1-3 -6	9.20	1-2 -3½	10.30
1-3 -5	9.40	1-2 -3	10.50
1-2½-4	9.70	1-1½-3	10.70
1-2 -4	10.00	1-1 -2	12.50

ST. PAUL, MINN.—Prices per cu. yd. delivered within three miles of plant. (m)

1-2-4 mix	6.75	1-3-5 mix	6.30

(m) For greater distances of haul, increase of 10c per cu. yd. per mile.

WILKES-BARRE, PENN.—Prices per cu. yd. delivered within one mile of plant, subject to discount of 25c per cu. yd. for payment within 10 days from date of delivery. Extra charge of 15c per cu. yd. for each additional mile.

Mix	Gravel	Stone	Mix	Gravel	Stone
1-2 -3	7.60	7.90	1-3-5	6.75	7.05
1-2 -4	7.30	7.60	1-3-6	6.75	7.05
1-2½-5	7.00	7.30			

NEWARK AND HARRISON, N. J.§

Mix	
1-2 -4	9.50
1-3 -5	9.00
1-3 -6	8.50
1-2½-5	9.25

§Discount of 2% if paid by 10th of month following delivery.

New Sand-Lime Brick Plant for Los Angeles

A NEW SAND-LIME BRICK PLANT is to be erected at Los Angeles, Calif., by the Pacific Hardstone Brick Corp. as soon as permission to operate is granted by the planning commission and the city council.

The plant is to be located on a 40-acre tract at Tujunga Avenue and Vancouver Street, in the North Hollywood section of the San Fernando Valley, and it is the intention to take the sand from this tract.

The plans include a four-story building to cost $40,000 and the installation of $100,000 worth of machinery. This machinery includes three rotary presses with a capacity of 60,000 brick per day and was made by the Maschinenfabrik Buckan R. Wolf A.-G. of Magdeburg, Germany, affiliated with the Krupp works.

The Pacific Hardstone Brick Co. has the California rights for the manufacture of brick by this process, the only other plant of the same kind in the country being that of the Hardstone Brick Co. of St. Paul, Minn., which has shipped brick as far as Chicago.

The new plant is to be completed in four months after permission is granted and will employ 50 to 100 men.

The offices of the Pacific Hardstone Brick Co. are at 416 West Eighth Street, Los Angeles. Hans Mecke is president and Murray W. Cox is general manager.

Wisconsin Sands Contain Gold?

SAND AND GRAVEL producers who are giving away their materials at the lowest prices in recent years may take heart from two recent news items.

* * *

Gold in Wisconsin? Authorities doubt it. But anyway, Alex Belanger, Chicago, maintains he found gold in sand at his Lake Como cottage near Elkhorn.

To bear out his assertion he had the word of a Chicago jeweler that the sand would assay about $800 a ton, he said.

Belanger was digging a post hole the other day. About five feet down he struck an unusual type of sand. He washed it and said he noticed golden glints on the heavy particles. Tests, he said, showed the particles contained gold.—*Wisconsin* (Milwaukee) *News.*

Gold, sapphires and magnetite, the latter a form of iron ore, have been found in the pits of the Lannon Sand and Gravel Co., Lannon, Wis., according to Thomas Rodgers, director of Milwaukee's paving laboratory.

Mr. Rodgers visited the quarry recently and took several samples of rock to his laboratory. Investigating under a microscope, he discovered tiny particles of gold, sapphires and the iron ore.

He declared, however, the gold was in such small particles a man could pan the gravel all his life and only realize a few hundred dollars from his efforts.—*Wisconsin News.*

Order Suit to Force Cement Dust Control

DISTRICT ATTORNEY JAMES F. HOEY was instructed on May 4 to file suit for abatement of dust from the Cowell Portland Cement Co. plant in Clayton, Calif.

This action was taken by the board of supervisors at Martinez following a statement by W. H. George, cement plant manager, that he needed more time to study the situation.—*Pittsburg* (Calif.) *Post Dispatch.*

State of Washington Buys Gravel Pit

NEGOTIATIONS for the purchase by the state of Washington of a gravel pit were completed May 8. The material site is in the vicinity of Bremerton, and is declared to provide an abundance of rock suitable for crushing and of high-grade road surfacing value.

This deposit will be used on road construction and improvement work to be undertaken by the state highway department.—*Bremerton* (Wash.) *News Searchlight.*

News of All the Industry

Incorporations

Quartzite Stone Co., Concordia, Kans., $25,000.

Certified Concrete Products Corp., Philadelphia,

Crescent Gravel Co., Hersey, Mich., $30,000. Penn., $25,000.

Maxwell Gravel Co., Indianapolis, Ind., reported to have filed notice of preliminary dissolution.

Red Rose Farms, Inc., Northville, Mich., $60,000. To engage in quarrying, logging and building.

Igenous Sand and Gravel Co., Detroit, Mich., $25,000.

Hopkinsville Stone Co., Hopkinsville, Ky., increased capital from $25,000 to $50,000.

Carbonated Lime Processes, Ltd., Toronto, Can., 50,000 shares of no par value.

Nepean Sandstone Co., Ltd., Ottawa, Can., $40,000.

Mississippi Portland Cement Co., Wilmington, Del., $5,000,000.

Sheboygan Sand and Gravel Co., Sheboygan, Wis., $25,000, or 250 shares at $100 each. Geo. E. Reimer, Herm Fritsch and Elsa Reimer.

Stubenvoll Concrete and Construction Co., 4833 Montana street, Chicago, Ill., $2.500. Josef, John and Josef, Jr., Stubenvoll.

Duntile Concrete Products Co., Morgantown, W. Va., $1,000. Charles S. Bliss, Bessie O. Bliss, Harry W. Cain, E. J. Cox and Stanley R. Cox, all of Morgantown.

Custer Sand and Gravel Co., Custer, Wis., 100 shares at $100 each. J. G. Goetz, O. T. Goss and R. C. McMahon.

Cowbay Sand and Gravel Corp., Yonkers, N. Y., $5,000. P. Collins, 501 East 161st St., Manhattan, New York City.

Vi-Clay Sand and Mineral Co., Terre Haute, Ind., 800 shares at $25 each. Ora Sowers, D. M. Crawford and B. J. Crawford.

Scarboro Gravel and Supplies, Ltd., Toronto, Can., $50,000. Alfred Cheesman and others. To produce gravel, sand, cement, etc.

Pekin Stone Products Co., Lockport, N. Y., $20,000, consisting of 400 shares, par value $50 each. E. Kirk Webster, Myron J. Wurtenberger and David E. Jeffery, 60 Morrow Ave., Lockport, N. Y.

General Stone Sales Corp., Bloomington, Ind., 2500 shares at $100 each, and 500 shares of no par value. William Wilms, W. H. Johnson, Kenneth Cline, A. A. Beck and D. G. Wylie.

Albert F. Canning, Inc., Union, N. J., $100,000. Albert F. Canning, Irvington, N. J.; Elvin H. Ullrich and Albina Braz, Union, N. J. To produce building materials.

Cranston Sand and Gravel Co., Inc., Cranston, R. I., $25,000, consisting of 250 shares common at $100 each. Jas. V. Cardi, 17 Bolton St., Cranston, Lillian Cardi and Ugo Riccio.

Quarries

Alpena, Mich. Dock building operations at the Thunder Bay Quarries Co. were started here May 7 The Shamrock is being used to dredge the channel at the edge of the dike. This material is being used as fill for the new dock.

Trenton, Mo. A rock crusher has been installed near the Big Oak school by Dr. W. H. Winningham and R. J. Martin. Crushed rock for road construction and agricultural limestone will be produced.

Louisiana Quarry Co. is now operating its new $500,000 plant five miles west of Winnfield, La.

Industrial Engineering Co., Kansas City, Mo., is now operating the rock quarry on the Wayman farm south of Princeton, Mo.

North Hollywood, Calif. At a meeting of the Fernangles chamber of commerce it was brought out that strong opposition by property owners will be brought against the proposed rock crusher to be located in the Tujunga wash.

Alcott and Poff have opened a limestone quarry on the Ed Rudolph farm four miles north of Genoa, Wis. A crusher is now in operation.

Sand and Gravel

Janesville, Wis. Gravel for the fill for the new athletic field of the Wilson School is now being taken from the railroad property on South Pearl St. It is the third pit to be opened for this job.

Lloyd Wilson of Detroit, Mich., has rented the gravel plant of the city of Sault Ste. Marie, Mich., and will move it to property he has purchased near the city gravel pit on Larke road. He will furnish the city gravel from his pit and return the equipment at the end of the season.

Michigan City, Ind. The first boat load of sand for use on the Dunes Relief road arrived here April 28. Difficulty was experienced in entering the 15.6-ft. channel to the harbor, as the boat, S.S. Fontana, owned by Construction Materials Corp., draws 16.6 ft. of water when loaded. The sand was brought from Grand Haven, Mich.

Interstate Sand and Gravel Co., Covington, Ind., recently installed new gravel washing equipment in its plant.

Wilson Sand and Gravel Co., Harvey, Ia., has let contract for construction of an office building to replace the one recently destroyed by fire.

George W. Camery, Barry, Mo., is making improvements to his gravel plant.

Norwalk, Ohio. County road department has opened what appears to be a very satisfactory gravel pit on the Pfeiffer farm in Hartland township.

Construction Materials Corp., Chicago, Ill., has been awarded contract for filling 7,000,000 cu. yd. of sand covering an area of 259 acres by the Lincoln Park Board, Chicago. Work on the project will start about June 1.

Western Sand and Gravel Co., La Salle, Ill., is now operating its new plant with an 8-hour shift. Reports indicate it will be able to produce about twice as much gravel as the old plant.

Timpson, Tex. The county has purchased gravel pits from U. L. Sapp, about four miles south of town. The gravel will be used for improvement of roads.

Clearwater Gravel Co. has completed stripping its gravel pit at Bagley, Minn. A two-mile spur has been completed and 45 gravel cars and a locomotive have been delivered. Machinery has been placed and water for washing the gravel provided.

Appleton, Wis. Bids were taken May 11 by the county highway committee on their gravel crushing and loading plant, which is to be sold to the highest bidder.

Huron Engineering Co., Toronto, Canada, has purchased the sand and gravel plant on the L. E. and N. R. R. near the Grand river west of the city. The plant, which has not operated for two years, will be placed in operation as soon as it is overhauled and new machinery installed.

La Grange Stone Co., Chicago, Ill., is establishing a gravel washing and loading plant on the H. C. Detloff farm, Luverne, Minn. It is estimated $40,000 will be invested in the plant.

Ideal Sand and Gravel Co., Mason City, Ia., recently made improvements to its plant so as to supply gravel to fit both Iowa and Minnesota state highway specifications.

Standard Sand and Gravel Co., Wheeling, W. Va., is asking Federal permission to construct a derrick hoist on the bank of the Ohio river at Moundsville, W. Va., and to dredge material from the river for a landing.

Gallipolis, Ohio. The Pittsburgh Gravel Co. has purchased six used barges 100 ft. long, 26 ft. wide and 6 ft. deep from the Carnegie Steel Co.

Muskingum River Gravel Co., Zanesville, Ohio, started dredging operations in the upper pool of the Muskingum river near Ellis, Ohio, in May for the first time in two years.

Portsmouth Sand and Gravel Co., Portsmouth, Ohio, is now operating its new tipple just east of the Kentucky approach to the U. S. Grant bridge.

Custer Sand and Gravel Co. has established an office in Stevens Point, Wis. Joseph Goetz, president and manager of the company, is in charge.

Dark Canyon Stone Co., Rapid City, S. D., recently purchased the C. P. Anderson sand plant on the Cheyenne river near Creston, S. D. The plant will be enlarged soon and the C. M. & St. P. R. R. will build a spur to the plant.

Sheridan Sand and Gravel Co., Sheridan, Ill., started its new plant on a production basis April 27.

Penglase Sand and Gravel Co., Grayville, Ill., is temporarily rebuilding its dredge, which burned recently. This work is being rushed to enable the company to fill an order for 25,000 cu. yd. of sand for state highway work. It has been announced that upon completion of this order a modern dredge will be built to be equipped with Diesel primary power and full electric auxiliary power.

Cement

Alpha Portland Cement Co. and **Lehigh Portland Cement Co.** were represented at the annual spring opening of Young's City Lumber Yards, at Princeton, Ky., May 2.

Volunteer Portland Cement Co., Knoxville, Tenn. Damage suits totaling $200,000 against the cement company were heard in Circuit Court May 11. Suits allege dust from the plant has damaged nearby greenhouses and truck farms operated by two parties.

International Portland Cement Co., Spokane, Wash., is now operating its Irvin plant on three eight-hour shifts.

Marquette Cement Manufacturing Co., Chicago, Ill., is completing extensive improvements at its plant in Cape Girardeau, Mo. Conditions have forced it to temporarily give up a further program of expansion, but it is intended to see its fulfillment when practical, Mr. Wecker, secretary and treasurer of the company, recently said.

Allentown, Penn. As a result of achieving a perfect record in 1930 in having no lost time accidents, the Sandt's Eddy plant of the Lehigh Portland Cement Co. celebrated with a banquet and special program at the Ross Common Hotel here May 7. Col. E. M. Young, president, honored the occasion with a striking address, congratulating the employes on their fine record.

York, Penn. Special exercises were held at the local plant of the Medusa Portland Cement Co. to celebrate the award to the plant of its second safety trophy by the Portland Cement Association.

Northwestern States Portland Cement Co. reports five salesmen have been with the company 20 years or more. The five men are A. Nelson, J. E. Meyer, W. A. Winter, P. A. Danielson and J. F. Lynch.

Blaine S. Smith, president, Pennsylvania-Dixie Cement Corp., told stockholders at the annual meeting unfilled orders as of April 1, 1931, were about the same as a year ago, with bookings showing an upward tendency. Selling and administrative expense in 1930 was $102,460 less than in 1929, which followed a reduction of $145,507 in 1929 below the 1928 total.

Canada Cement Co., Montreal, Can., held a meeting of directors May 15. C. E. Neill and F. B. Kilbourn were elected to the existing vacancies on the board. Mr. Neill is vice-president and managing director of the Royal Bank of Canada, while Mr. Kilbourn is general superintendent of Canada Cement Co.

Montreal, Canada. Revised statistics just issued by the mining, metallurgical and chemical branch of the Dominion bureau of statistics, show that shipments from Canadian cement plants during 1930 totaled 11,032,538 bbl., valued at $17,713,067 as compared with 12,248,081 bbl. worth $19,337,235 in 1929.

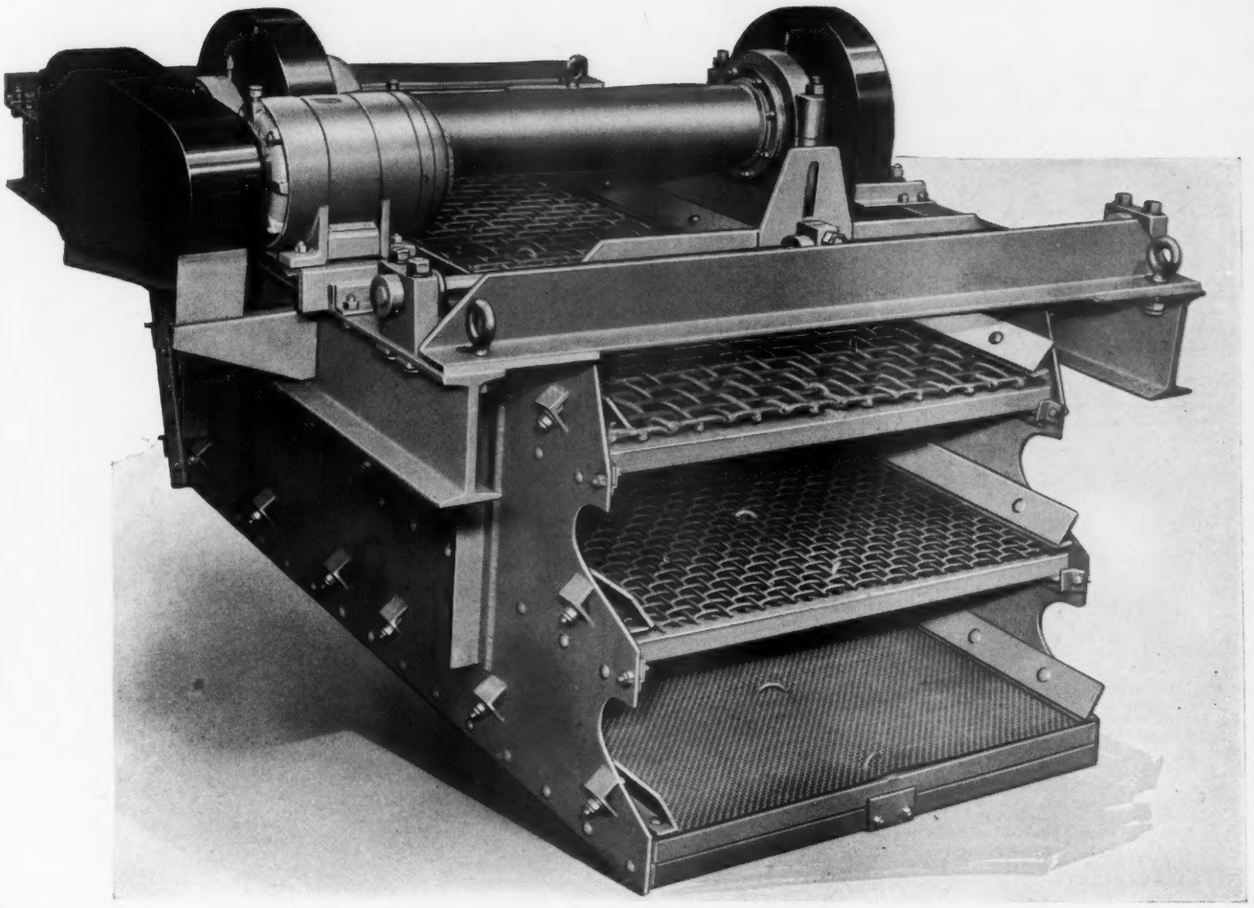
Gypsum

Gypsum, Lime and Alabastine, Ltd., Canada, announces a guaranteed plastering system and steel reinforcing for stucco as new products recently added to its line. R. E. Haire, president and managing director, says spring construction, with its attendant demand for gypsum materials, is keeping business close to normal. Export business was said to be satisfactory. At the stockholders' meeting directors were re-elected.

Lime

Idaho Lime Co., Evans, Wash., recently lost its plant by fire. The loss exceeded $25,000.

Stanley F. Plachecki and **Thomas E. McHugh**, Tyrone, Penn., have purchased the plant of Enterprise Lime and Ballast Co., Hyndman, Penn. It is



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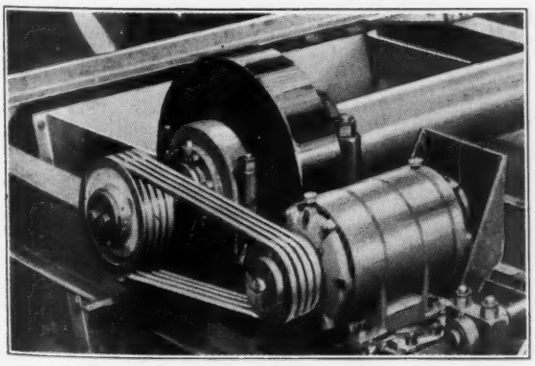

Motor and Texrope Drive on an Allis-Chalmers Centrifugal Vibrating Screen

When you buy an Allis-Chalmers vibrating screen, either one, two or three deck, you get a unit that needs but to be suspended and it is ready to operate. It is not necessary to buy a motor and drive and then find some place to install them as they are built into the screen at the factory.

The motor, a product of Allis-Chalmers, is of the totally enclosed fan-cooled type, dirt-proof and water-proof. It is so thoroughly protected that you can turn a stream of water on it while it is running and not harm it.

The Texrope Drive, originated by and built by Allis-Chalmers is slipless, vibrationless and flexible. Dirt and water cannot hurt it. It is large enough to carry any overloads that may be demanded of it.

With the screen, motor and drive built by one organization the responsibility for the successful operation of the unit rests on that organization. For further details on Centrifugal Vibrating Screens get in touch with the nearest Allis-Chalmers office, or write for Bulletin 1470-B

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Allis-Chalmers Manufacturing Company, Milwaukee

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said a crusher with capacity of 1000 tons daily will be installed, as well as a hydrator.

Agricultural Limestone

American Cyanamid Co., New York, N. Y., has recently issued attractive circulars describing its agricultural limestone and "Shell-maker" for poultry.

Olin, Ia. More than 2000 tons of agricultural limestone have been pulverized since last September by George S. Vernon and son with a portable crusher they are operating here. They deliver by truck and charge $1.85 per ton.

Lewistown, Ill. Limestone in the southwest boundary of Peoria county is to be crushed and tested for agricultural use. Will Kelly and John Petto have ordered a crusher and will test the stone in actual use.

Miscellaneous Rock Products

Consolidated Feldspar Corp., Trenton, N. J., recently acquired the grinding mill of Flynt Silica and Spar Co. of Los Angeles, Calif. Extensive alterations and improvements were planned. The day after this plant was acquired fire completely destroyed it. Estimated loss is $50,000.

Wrangell, Alaska. Over $75,000 has been invested in asbestos quarries 16 miles from Douglas and the owners plan to increase output this summer.

Helena, Mont. Vast deposits of onyx have been found between Puller's Hot Springs and Dillon, Mont. The deposits, which comprise approximately 2000 acres, are owned by Montana Onyx Co. Efforts are being made to find markets for the product.

Asbestos Bureau, Inc., with offices in Portland, Seattle and Tacoma, Wash., is a new organization through which asbestos firms in the Northwest have united to establish minimum standards for installation of insulation jobs. Certified insulation will be promoted.

Southern Alkali Corp. has been formed by officials of American Cyanamid Co. and Pittsburgh Plate Glass Co.; 350 acres near Corpus Christi, Tex., has been purchased for a new plant to produce alkali products and commercial chemicals. A ship channel and harbor will be built for ocean-going vessels. Total investment of more than $5,000,000 is planned.

Wedron Silica Co., Wedron, Ill., is adding storage bins to its plant.

Monterey, Calif. Fire entirely destroyed the diatomaceous earth plant of Calatom Co. near here on April 23. Loss estimated at $50,000.

Johns-Manville Corp., New York, N. Y., recently entertained its dealers from Erie, Crawford and Warren counties, Penn., at Erie. The new line of asbestos shingles was presented to dealers attending.

Cement Products

Concrete Products' plant, North Wilkesboro, N. C., has added 36-in. tile, concrete building blocks and cemetery coping to its list of products.

Akron Art Stone Co., Akron, Ohio, recently had a news story of its products and a picture of its cast fountains in the local paper.

Shearman Concrete Pipe Co., Shreveport, La., plans to erect a concrete pipe plant at Alexandria, La.

Seattle, Wash. Contract for the construction of a concrete mixing plant to cost $22,500 for the naval department at Pearl Harbor has been awarded.

Henkel Construction Co., Mason City, Ia., is now delivering ready-mixed concrete from it new plant. It is said they have a production capacity of 400 cu. yd. per day.

Portland, Ore. A proposed new code regulating the quality of concrete is under consideration by the Oregon building congress and the local chapter of the Associated General Contractors. Provision for qualification of an expert in concrete mixing is considered necessary. Co-ordination of the code will be completed and submitted to a general meeting soon.

Personals

Follett Morris of Napa, Calif., will be the manager of the gravel plant recently purchased from John D. Grant by Basalt Rock Co.

Clarence Hawkins, manager of the Ouachita plant of Arkadelphia Sand and Gravel Co., made his first solo flight after 3½ hours of instruction. The flight was made April 19.

Darwin Meisnest, vice-president and director, Pacific Coast Cement Co., Seattle, Wash., is resigning to assume direction of Washington Athletic Club in capacity of executive vice-president.

R. H. Bacon, former advertising manager for Fairbanks, Morse and Co., Chicago, Ill., has been appointed by them as manager of the pump sales division, with headquarters in Chicago. Mr. Bacon has been associated with the company since 1925, when he took charge of publicity for the Diesel engine division. Shortly thereafter he was placed in charge of general publicity, and since 1929 has been manager of the advertising and publicity department. Mr. Bacon graduated in electrical engineering at the University of Illinois in 1916.

R. H. Bacon

W. J. Welp, formerly with Humboldt Gravel and Tile Co., has been named manager of the Ft. Dodge Limestone Co., which will begin operations June 1. The company is installing equipment valued at $12,000.

George Westinghouse memorial. In a colorful ceremony, the first of the 40 Japanese cherry trees, tribute of the Westinghouse Society of Japan to the memory of George Westinghouse, was planted near the Westinghouse Memorial in Schenley Park, Pittsburgh, Penn., May 9. Because of the traditions, history and legends that surround cherry blossoms in Nippon, this method was chosen as the most appropriate in which such tribute could be expressed.

S. M. Kintner

S. M. Kintner, who has been assistant vice-president of the Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn., was elected vice-president in charge of engineering for that company at a recent meeting of the board of directors. He succeeds W. S. Rugg, who has been elected vice-president in charge of sales.

Dr. Kintner graduated from Purdue University in 1894, where he studied electrical engineering. Since graduation he has completed various important research and development projects. He has spent many years with the Westinghouse organization.

Obituaries

J. George Lehman, 57, Bethlehem, Penn., president of the Bethlehem Foundry and Machine Co., ended his life recently in his home. Financial trouble was attributed as the cause. He graduated from Lehigh University in 1896.

Alfred Freeman Coats, at one time president of the Washington Portland Cement Co. before its merger with the Superior Portland Cement Co., died April 25 at the Swedish Hospital, Seattle, Wash. In the past few years Mr. Coats had devoted his time to his lumber interests.

Manufacturers

American Manganese Steel Co., Chicago Heights, Ill., announces the new location of its Pittsburgh, Penn., office as 1504 Grant Bldg., Fourth Ave. and Grant St.

Blaw-Knox Co., Pittsburgh, Penn., has acquired exclusive sales and manufacturing rights of the AETCO line of earth-moving machinery from American Tractor and Equipment Co. of Oakland, Calif., for the United States east of the Rocky Mountains and for all other countries. The line includes hydraulically operated earth movers, bulldozers, scarifiers, tamping rollers and combustion outfits.

Dardelet Threadlock Corp., New York, N. Y., has granted license to Colorado Fuel and Iron Co. for the manufacture and sale of track and commercial bolts and nuts formed with the Dardelet self-locking thread.

Hill Clutch Machine and Foundry Co., Cleveland, Ohio, announces the new location of its New York office as Room 606, 90 West St. Arthur L. Whiteside will continue in charge of the New York territory.

Merco Nordstrom Valve Co., San Francisco, Calif., has moved its Boston office to 250 Stuart St. Enlarged offices have been taken and personnel increased.

Smith Engineering Works, Milwaukee, Wis., has moved its Chicago office to Room 1204, 211 W. Wacker Drive.

Stephens-Adamson Manufacturing Co., Aurora, Ill., announces a new Chicago office at Room 812, 20 N. Wacker Drive. C. H. Adamson has been appointed manager.

Chain Belt Co., Milwaukee, Wis., is building complete unloading equipment for a boat now under construction for O'Brien Bros. Sand and Gravel Corp. of New York. It will have an unloading capacity of 1000 tons an hour.

Graver Tank and Manufacturing Corp., East Chicago, Ill., has appointed W. B. Connor Co., New York, as its eastern representative.

General Refractories Co., Philadelphia, Penn., at a recent meeting of the board of directors elected Burrows Sloan president, E. A. McKelvy vice-president and Roger A. Hitchins secretary and treasurer. All of the other officers of the company were reappointed.

Trade Literature

NOTICE—Any publication mentioned under this heading will be sent free unless otherwise noted, to readers, on request to the firm issuing the publication. When writing for any of the items kindly mention ROCK PRODUCTS.

Blasting Caps. The Institute of Makers of Explosives is issuing printed matter and bulletins this month marking the fifth anniversary of the campaign being conducted to prevent accidents due to careless handling of blasting caps. The modern blasting cap is a copper shell containing fulminate of mercury, which is one of the most sensitive and impulsive explosives in common use. The caps should particularly be kept away from children. One cap is strong enough to blow a child's hand off. Approximately 500 children are killed or injured annually as a result of playing with these caps. THE INSTITUTE OF MAKERS OF EXPLOSIVES, New York City.

Stoker Unit. New folder on the C-E stoker unit, described as a self-contained underfeed stoker with electric drive and integral fan construction. According to the manufacturer, this stoker has been developed to provide a simple automatic machine tor the firing of small boilers up to 150-hp., and has a number of features not available in other machines of its size, such as agitated grate bars, side dumping grates and agitated feed hopper which eliminates arching of the coal and interrupted feed. COMBUSTION ENGINEERING CORP., New York City.

Material Handling Equipment. Folder on Hardinge grinding equipment (including conical ball and pebble mills, cylindrical mills, rod mills, batch mills, air classifiers, and unit coal pulverizers); feeding equipment (including constant weight feeders and volumetric feeders); thickening, clarifying and filtering equipment (including spiral and super thickeners, metallurgical, trade waste and disposal plant clarifiers); sanitation equipment (including sludge collection and removal apparatus, aerators, sludge pumps, coagulation units, sludge digestors and sludge dryers); drying, calcining and heating equipment (including single and double shell dryers, rotary drums, coolers, calciners and kilns. HARDINGE CO., York, Penn.

Electric Flow Meters. Attractive folder describing the Brown electric flow meter, which not only records rate of flow changes, but shows just how many pounds of steam, gallons of water, barrels of oil, cubic feet of air or gas were delivered during any part of the day or night. BROWN INSTRUMENT CO., Philadelphia, Penn.

Sandblast Rooms, Tumbling Mills and Dust Arresters. A circular showing illustrations of sandblast equipment suitable for all kinds of foundry cleaning. The modern labor-saving features of this equipment is brought out. W. W. SLY MFG. CO., Cleveland, Ohio.

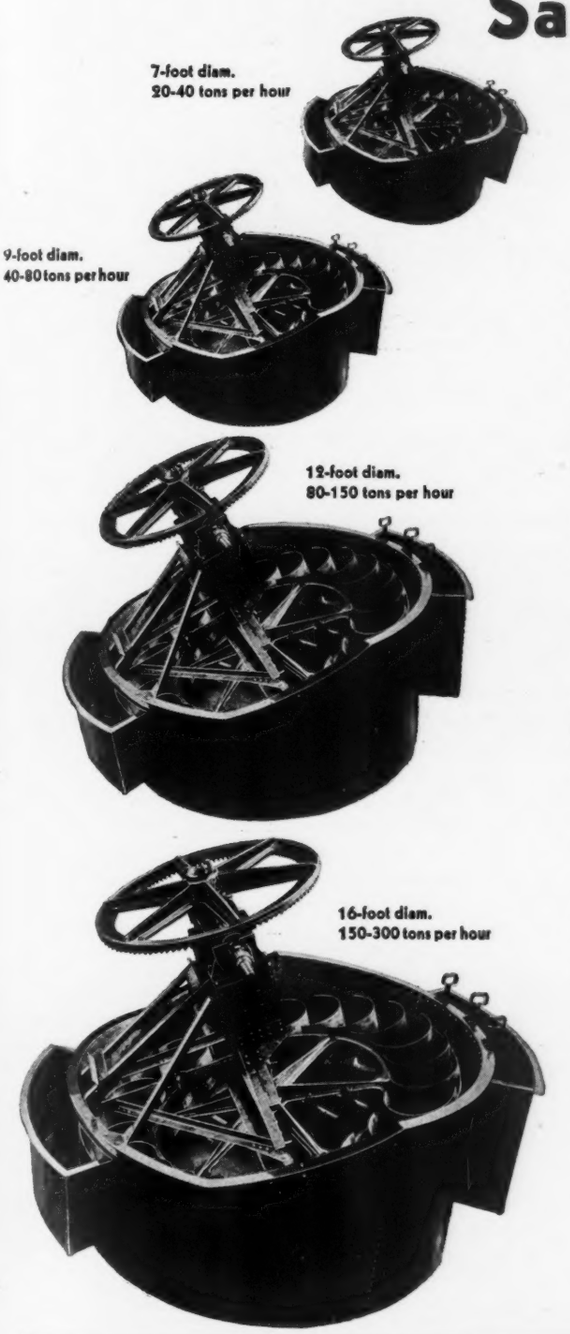
Truck Bodies and Hoists. The January-February issue of Heil News, **Vol. 5, No. 1,** contains an illustrated article on this winter's grooming of motor transport equipment in preparation for the coming spring road building programs. One picture shows part of the truck equipment used on a western job where concrete was poured for a two-week period in a steady stream with only 31.62 minutes for avoidable delays. HEIL CO., Milwaukee, Wis.

V-Belt Drives. The February issue of "Texrope Topics," **Vol. 1, No. 3,** has been issued. It contains illustrations of applications and the announcement of Bulletin **1470-A** for vibrating screen drives. ALLIS-CHALMERS CO., Milwaukee, Wis.

Air Separators. A four-page circular just issued on mechanical air separators for closed circuit grinding. RAYMOND BROS. IMPACT PULVERIZER CO., Chicago, Ill.

Nickel Steel. Circular **No. 7,** showing many applications in industry of parts made of nickel steel alloys, has been issued by INTERNATIONAL NICKEL CO., New York, N. Y.

Install a SINGLE UNIT Sand Washing Plant



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TRADEPRESS PUBLISHING CORPORATION
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W. D. Callender, President; N. C. Rockwood, Vice-President; C. O. Nelson, Secretary

LONDON OFFICE: Dorland House, Mezzanine Floor, 14 Regent St., S.W. 1.

NATHAN C. ROCKWOOD, *Editor and Manager*
EDMUND SHAW, Los Angeles, Calif., *Contributing Editor*
EARL C. HARSH, WALTER B. LENHART, H. O. HAYES, *Associate Editors*
A. M. STERN, *Assistant Editor*
RALPH C. SULLIVAN, *Advertising Manager*
E. A. SINE, *Production Manager*

FRED S. PETERS, *Eastern Manager*
E. H. PAULL, *Eastern Representative*
280 Madison Ave., New York City. Tel. Caledonia 5-4474
GEORGE M. EARNSHAW, *Central Advertising Manager*
2380 Winfield Ave., Rocky River, Ohio. Tel. Boulevard 4353
NORMAN BOGGS, C. L. WALKER, *Western Representatives*
Chicago. Tel. Wabash 3714-3715

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